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THE LANCET

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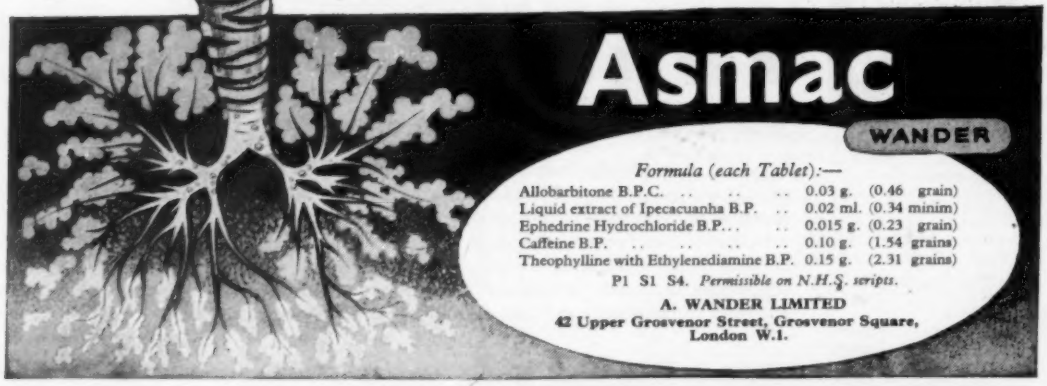

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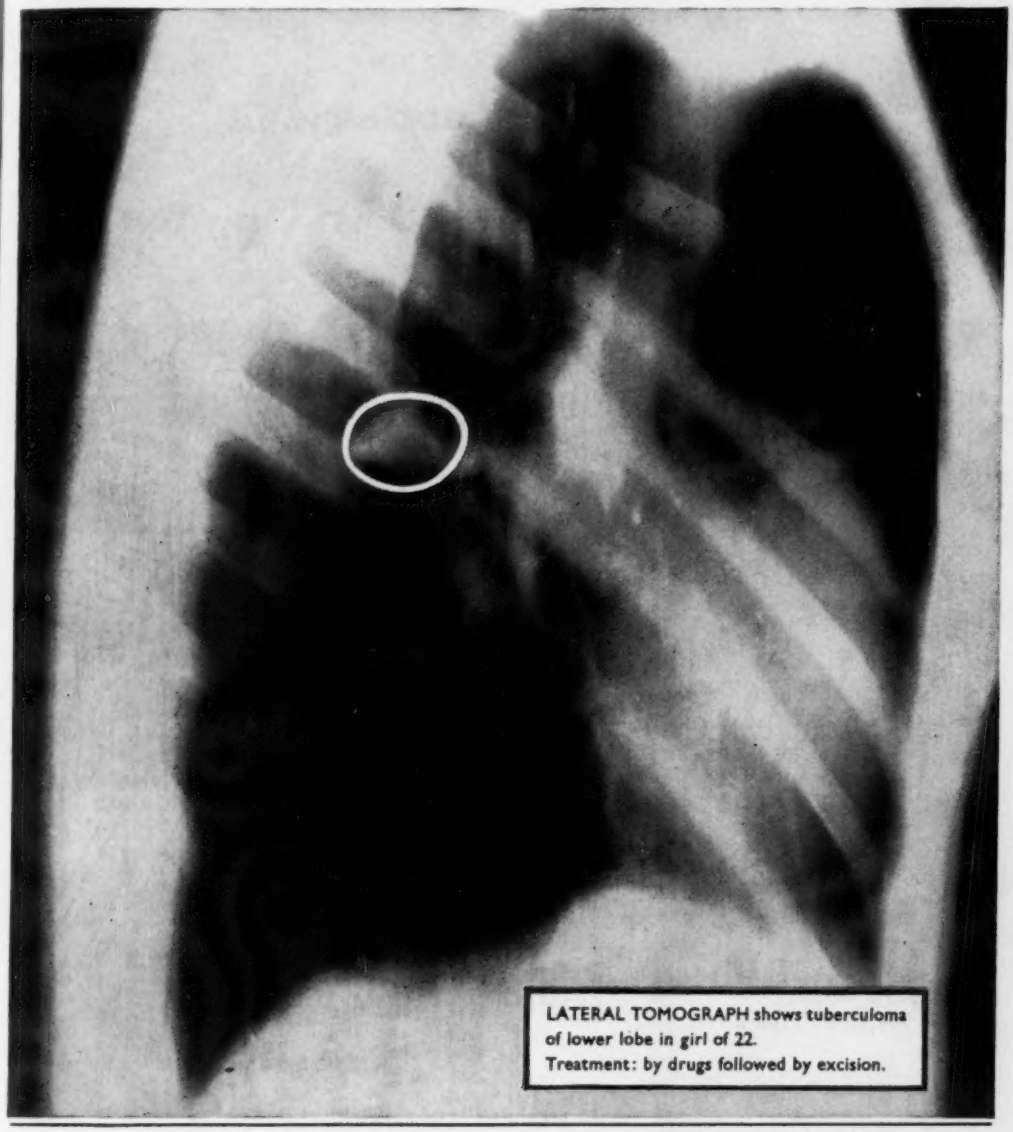

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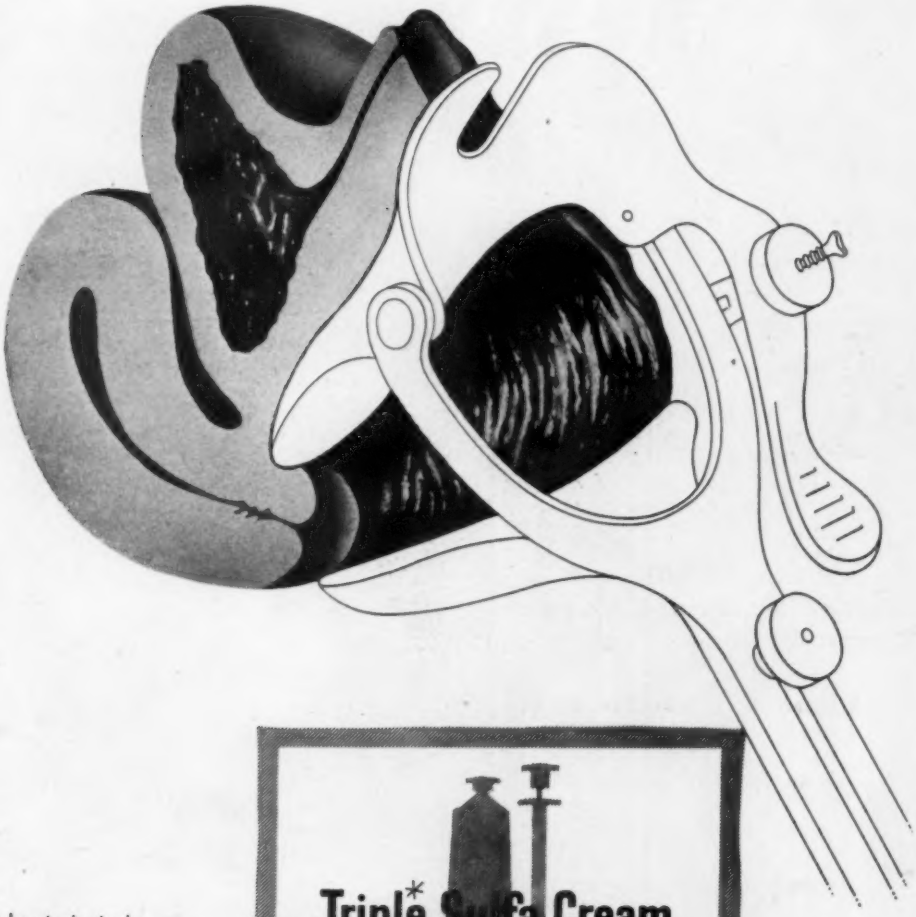

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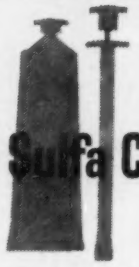

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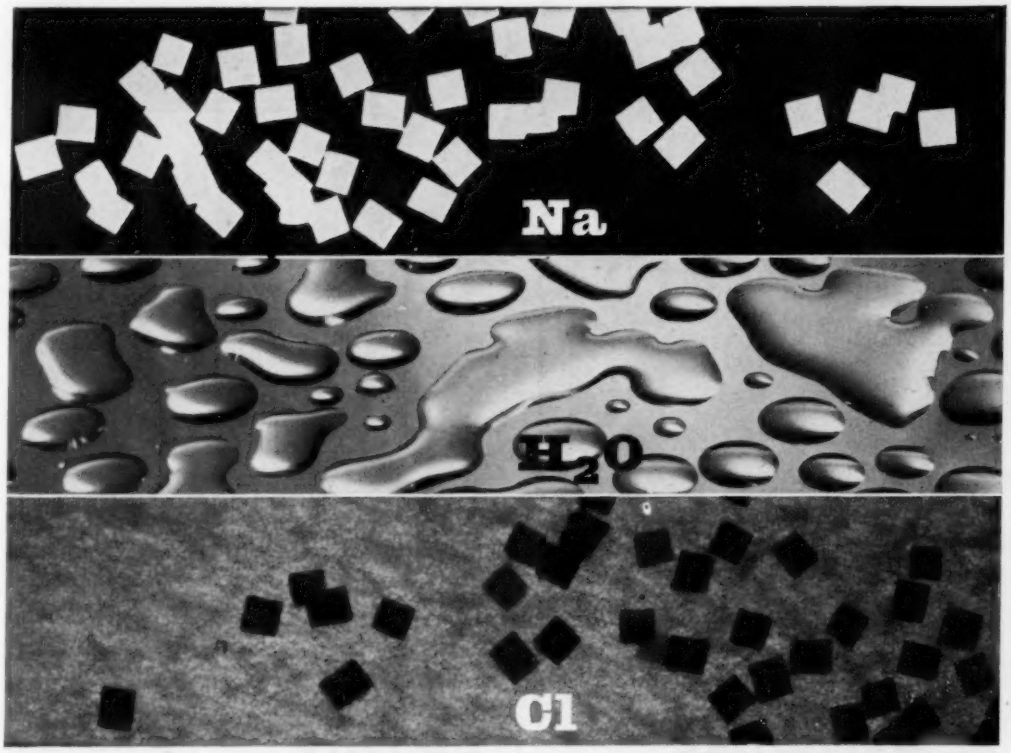

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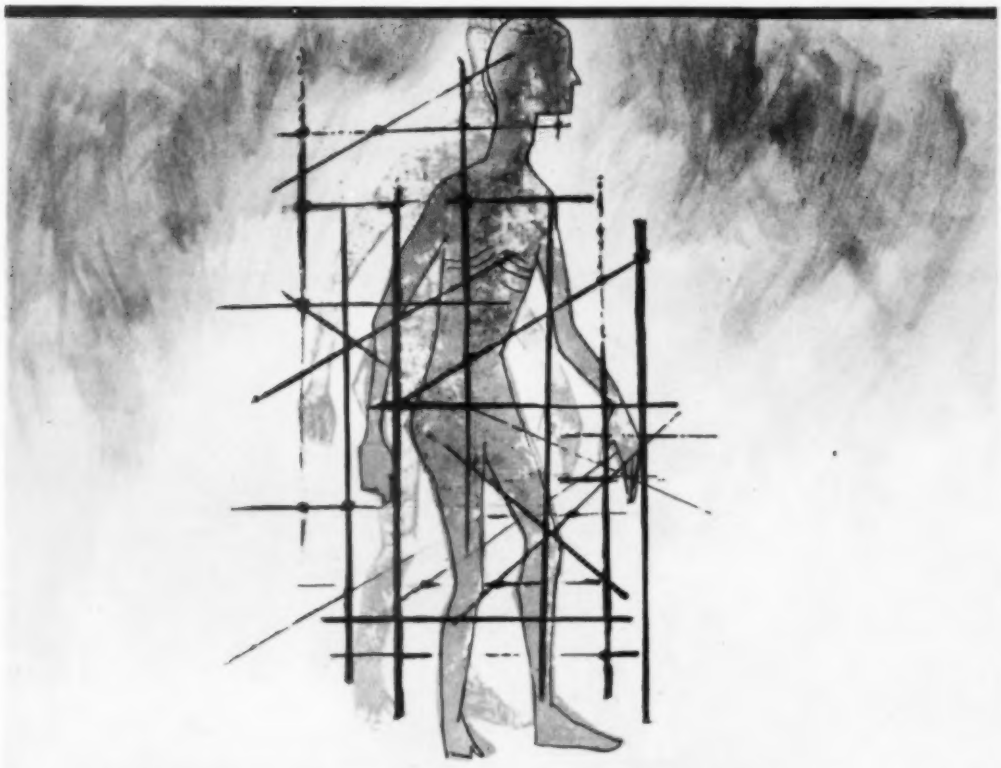

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1. ... *Unfallchir.* (1956) 48, 209.
2. ... *Wschr.* (1954) 66, 743.
3. ... (1953) 4, 78.
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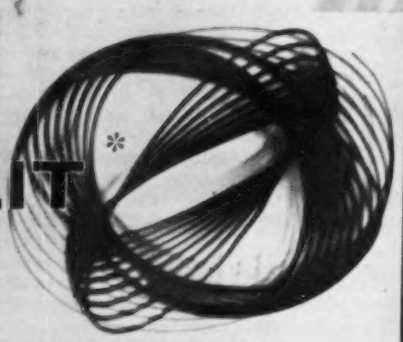

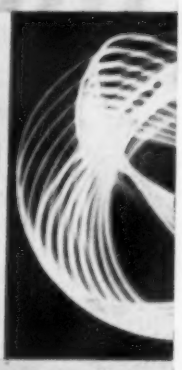

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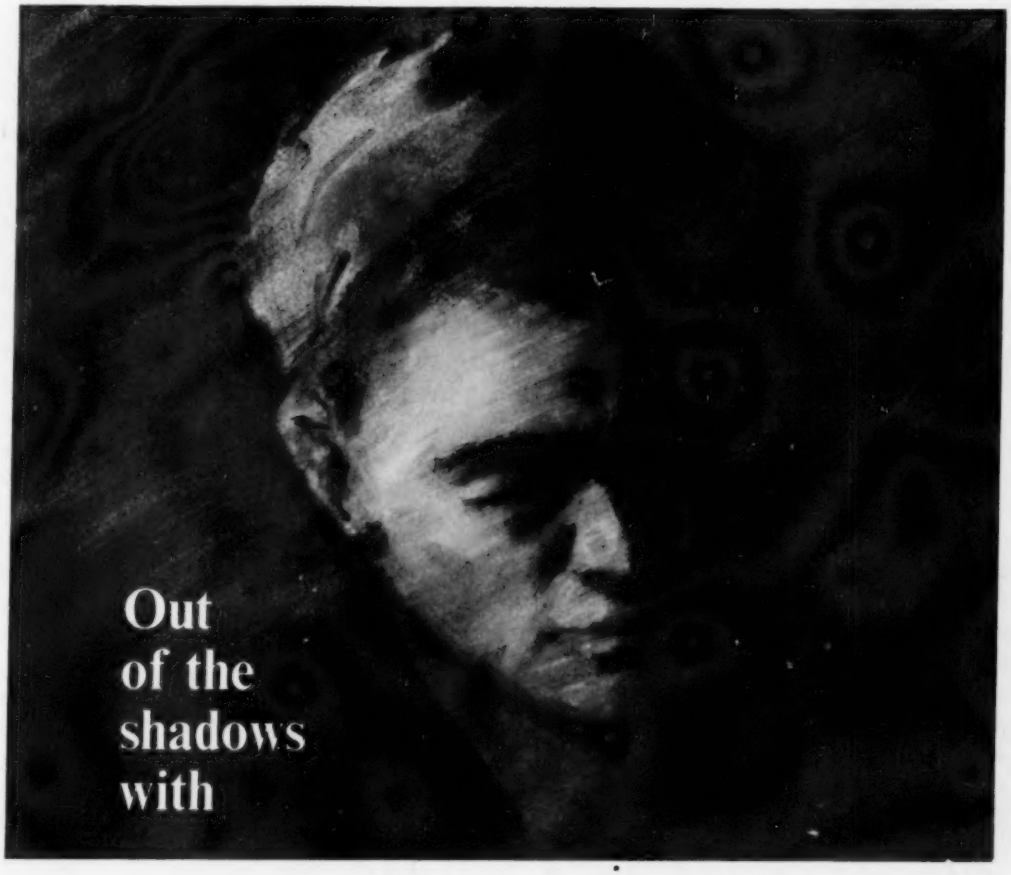

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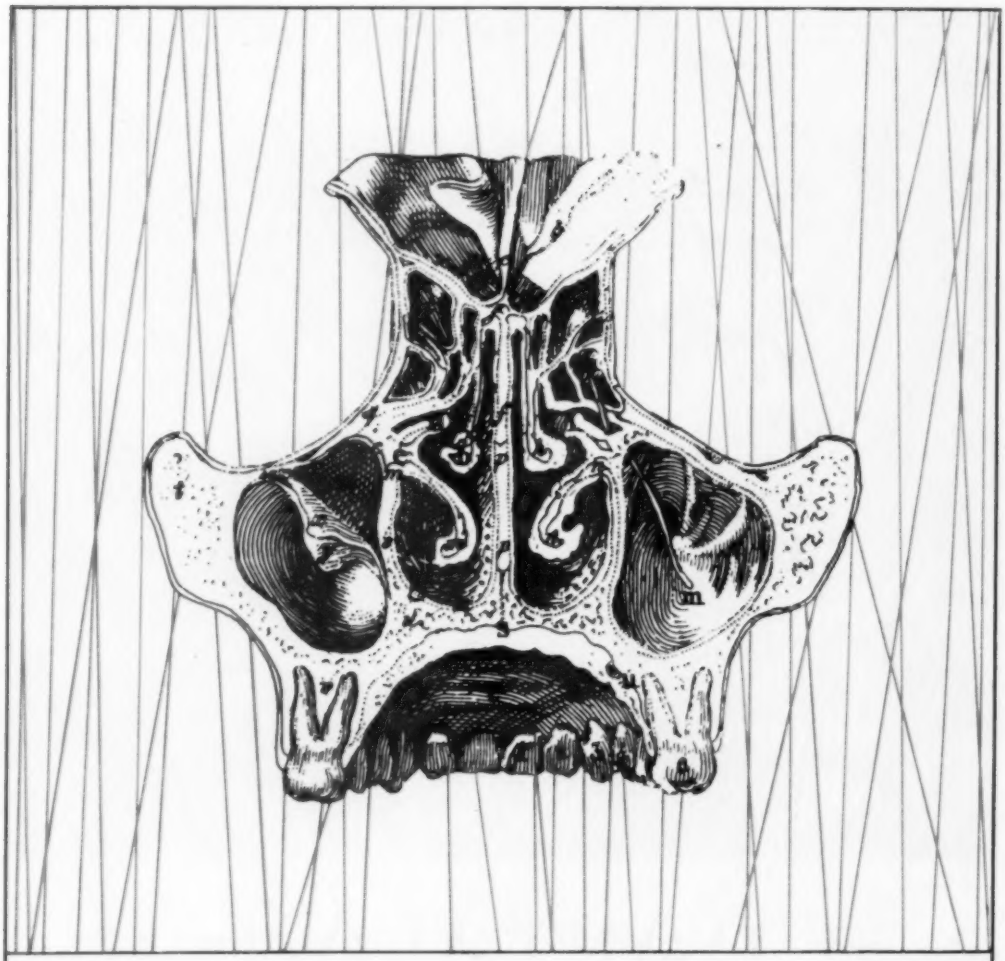

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(1954) *Arch. Otolaryng.* **59**, 312

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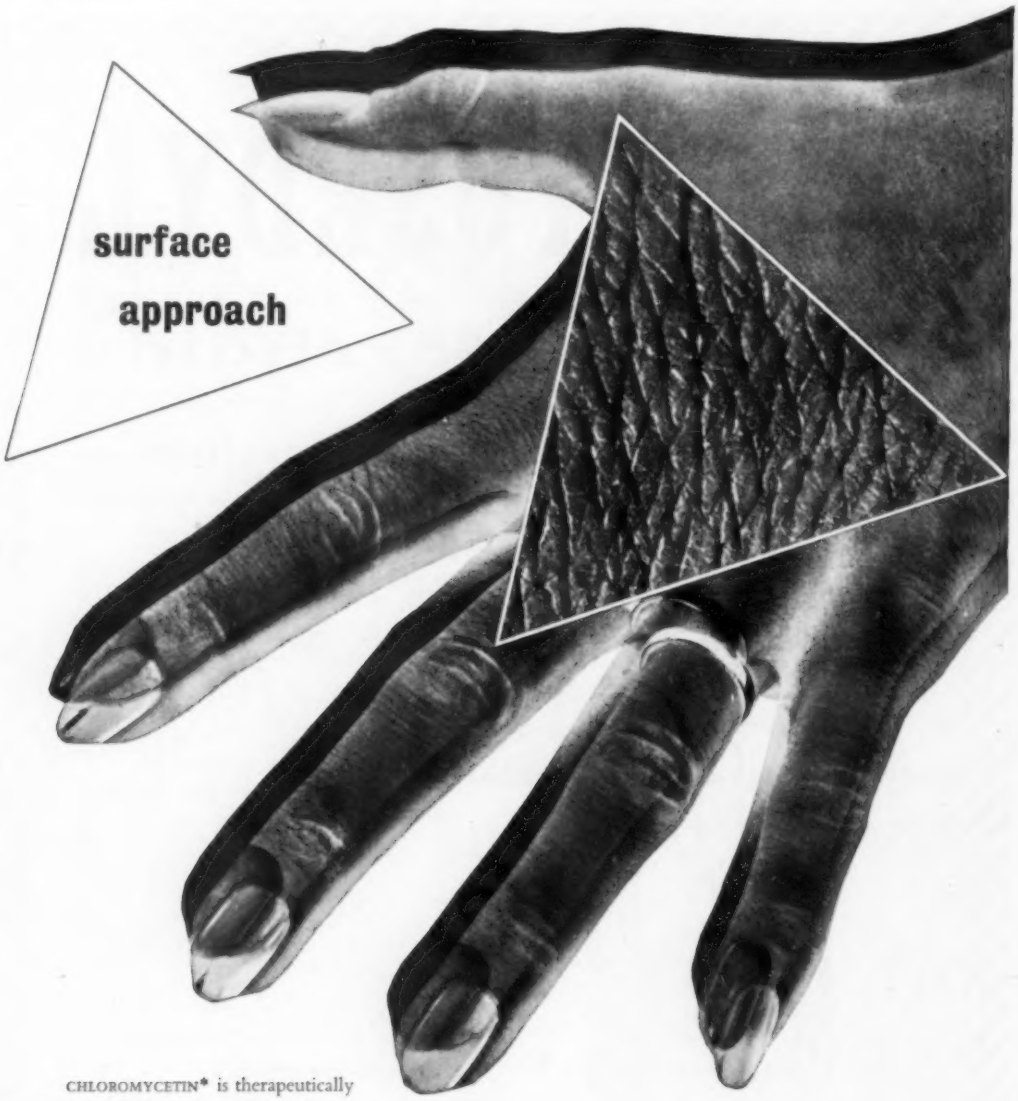

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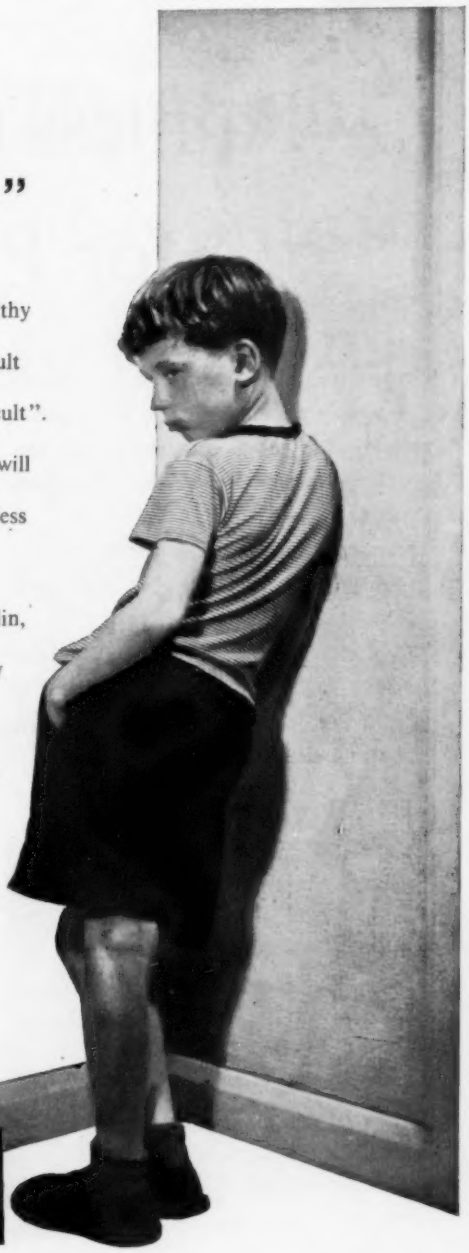
"He's such a problem, Doctor . . . . !"



In every other respect a normal healthy child, he has never been dry at night, with the result that he has acquired undeservedly the label "difficult". As he grows older his shame and embarrassment will become more acute as those around him become less tolerant of his disability.

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References: BMJ (1954)11, 1433; BMJ (1954)1 1038; BMJ (1955)1 1194; LANCET (1955)i 1228; LANCET (1956)ii 1334

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[1] *W.A. Journal of Biological Chemistry*, **2**, *42. 1958*

[2] *The treatment of Hæmorrhoids. Practitioner*, **178**, *230. 1958*

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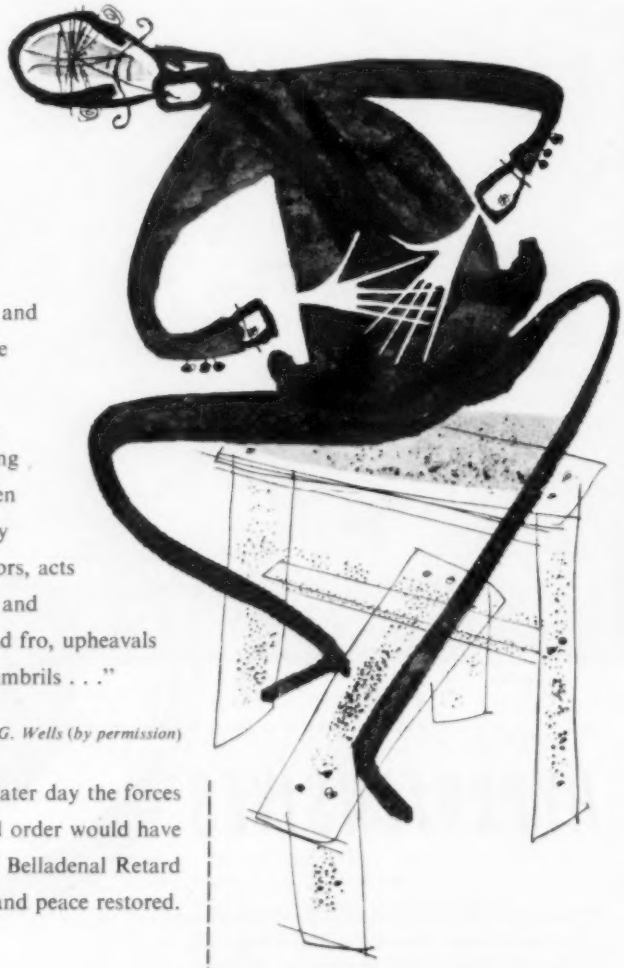

Case History of Mr. Polly

"Mr. Polly was sitting on a stile . . . and suffering acutely from indigestion. He suffered from indigestion now nearly every afternoon in his life . . . Wonderful things must have been going on inside Mr. Polly. It must have been like a badly managed industrial city during a period of depression; agitators, acts of violence, strikes, the forces of law and order doing their best, rushings to and fro, upheavals . . . the rumble and thunder of the tumbrils . . ."

From "The History of Mr. Polly", by H. G. Wells (by permission)

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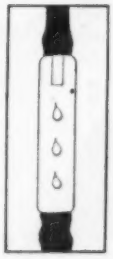

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A particular advantage of treatment with EFCORTELAN SOLUBLE is that hormonal side-effects are avoided.
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REFERENCES

1. Brit. med. J. 1958, **2**, *1072.*
2. ibid., 1077

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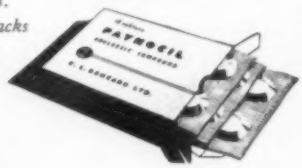

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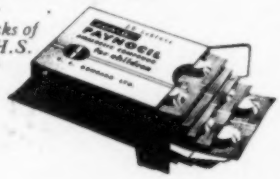

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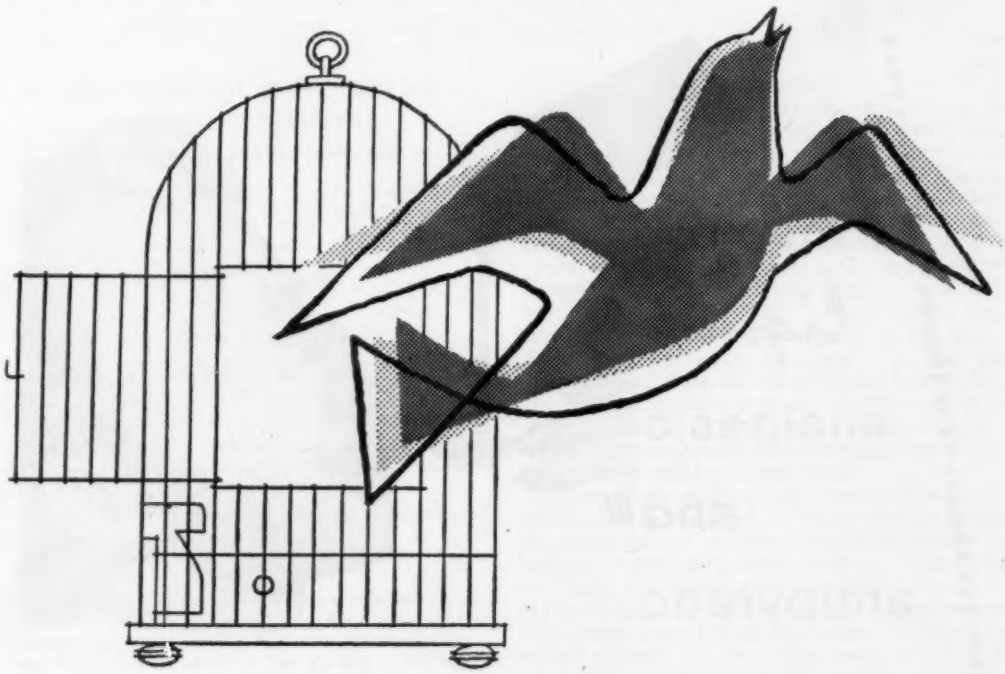

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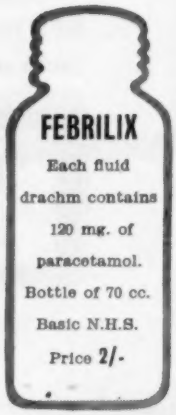

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STAPHYLOCOCCAL INFECTION IN A MATERNITY HOSPITAL

EPIDEMIOLOGY AND CONTROL

W. A. GILLESPIE
M.A., M.D. Dubl., F.R.C.P.I., D.P.H.
CLINICAL BACTERIOLOGIST

K. SIMPSON
M.D. Lond., M.R.C.P.
SENIOR PÆDIATRIC REGISTRAR

ROSEMARY C. TOZER
B.Sc. Brist.
BACTERIOLOGIST
UNITED BRISTOL HOSPITALS

THIS investigation was carried out in the Bristol Maternity Hospital for more than two and a half years, with the objects of studying the sources and modes of spread of staphylococci among infants, assessing the clinical results of staphylococcal infection, and evaluating some methods of reducing cross-infection.

The staphylococci referred to in this paper were all coagulase-positive *Staphylococcus aureus*.

Methods

The investigation was carried out among full-term infants, who were kept apart from their mothers except when feeding, and occupied nurseries on the 2nd and 3rd floors of the hospital. The former, nursery 2, had an area of 567 sq. ft. and accommodated up to 25 infants. Nursery 3 measured 288 sq. ft., and held up to 18 infants; but from this nursery a few infants, never more than 5, were sometimes removed to their mothers' rooms when 2–3 days old, and were not further investigated.

Premature infants were kept in a separate nursery and, except when stated otherwise, were not investigated.

The infants were cleaned up before leaving the labour ward, but were not bathed until their umbilical cords separated about 7 days later.

The nurses wore masks in the nurseries. They washed their hands and dried them with paper towels before and after handling each infant. They did not wear gowns when handling infants.

From Nov. 20, 1955, saline-moistened swabs were taken daily from the noses and the skin of the back of the neck of most infants until the 4th day of life, again on the 6th or 7th day, and again just before leaving hospital—usually on the 10th or 11th day. No neck swabs were taken after January, 1957. From Jan. 1, 1956, swabs were taken on the 2nd day of life from the base of the umbilicus and from the skin of the groins; one swab was used for both groins. During the first six months of the investigation, 38 infants were swabbed daily, except at weekends, from nose, umbilicus, neck, and groin. Later, swabs were taken at two-day intervals from the nose, umbilicus, groin, and perineum of many infants, and from the axilla and popliteal fossa of a few infants.

Swabs were taken each week from the noses and hands of nurses, and from the noses of 245 mothers on admission.

Two nutrient-agar "settle plates" were exposed for two hours thrice weekly in each nursery. Several "sweep plate" cultures were made each week from infants' blankets and garments (R. E. O. Williams, cited by Blowers and Wallace 1955).

All infants with clinical infections were seen by one of us, and swabs were taken from open lesions when possible.

The bacteriological methods were those described by Alder et al. (1955). Many staphylococci were phage-typed by the method of Williams and Rippon (1952), with the addition of phages 71 and 80 and the omission of phage 42D.

Results

Most infants became staphylococcal carriers before they were 2 days old. The umbilicus was usually colonised first and the groin almost as soon. The nose was colonised rather less rapidly, and the neck much less rapidly. In the period before Sept. 16, 1956 (after which the results were affected by special precautions taken to reduce cross-infection), the proportions of 2nd-day swabs which yielded *Staph. aureus* were: umbilicus, 169/287 (59%); groin, 177/324 (55%); nose, 126/286 (44%); neck, 78/286 (27%). Many infants acquired staphylococci in more than one site on the same day. Swabs from umbilicus, groin, and nose often yielded large numbers of staphylococci, cultures from the umbilicus being particularly profuse. Staphylococci evidently multiplied rapidly in these sites. Cultures from the back of the neck were usually scanty, perhaps indicating contamination with little multiplication.

Infants in nursery 2 usually became colonised a little sooner than in nursery 3, as can be seen by comparing the results for the control periods in the trial of chlorhexidine ('Hibitane') cream (table IV). The difference was small, and was not apparently caused by overcrowding in nursery 2 nor by differences in nursing technique. The smaller number of infants in nursery 3, and the permanent removal of some to their mothers' rooms when a few days old, perhaps accounted for the difference.

There were differences in the persistence of staphylococci in the various carrier sites. About a quarter of the infants' noses "at risk" acquired staphylococci in each of the first 6 days of life. (A nose was at risk when its previous swab had been negative.) Nasal carriage usually persisted until discharge from hospital, when 207 (88%) of 236 infants were nasal carriers. On the other hand, the umbilicus and groin, which were usually colonised before the nose, often lost their staphylococci later (see fig. 1). The decline in umbilical carriage during the 2nd week may have resulted from the drying and separation of the cord remnant about the 7th day. The similar decline in positive swabs from the groin suggested that the staphylococci often came from the umbilicus, and this was borne out by the fact that strains isolated from both sites on the same infant often had similar phage patterns.

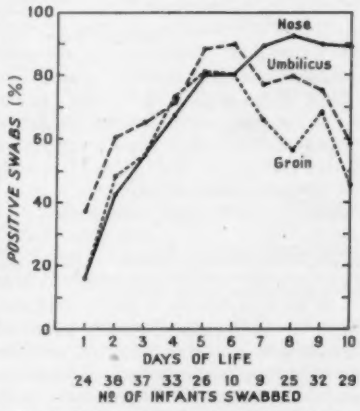

Fig. 1—Staphylococcal colonisation of nose, groin, and umbilicus in the first 10 days of life.

Cultures of staphylococci from the nose usually consisted entirely or predominantly of one strain, but two or more strains with different phage patterns could often be identified in cultures from the umbilicus and groin.

Following the recent demonstration by Hare and Ridley (1958) of the importance of non-nasal staphylococcal carriage by adults, we found, as described below, that the perineum and some other areas of the infant's skin were sometimes heavily colonised by staphylococci. Altogether, therefore, the infants harboured an enormous "load" of staphylococci.

Staphylococci were found to spread more often from an infant's umbilicus to his nose than in the contrary direction. In 24 infants from whom daily swabs were taken the umbilicus was colonised first in 11, the nose first in 3, and both sites simultaneously in 10. Phage-typing showed that, of 24 different strains of *Staph. aureus* which appeared first in umbilical swabs, 14 were later isolated from the noses of the same infants; while of 22 strains which appeared first in noses, only 6 were isolated subsequently from umbilical swabs taken from the same infants.

Antibiotic Resistance of Staphylococci

Of the 1016 staphylococci isolated from infants before Sept. 16, 1956, 702 (69%) were resistant to penicillin. Resistance to other drugs was almost entirely confined to the penicillin-resistant strains, of which 131 (18%) were insensitive to streptomycin and 98 (14%) to sulphonamide. Only 1 culture was resistant to tetracycline and 1 to chloramphenicol.

The resistance of the staphylococci appeared to be related to the therapeutic practice of the hospital. Between Sept. 1, 1955, and Dec. 31, 1956, 1195 infants were admitted to nurseries 2 and 3; antibacterial drugs were given by mouth or injection to 63 infants and 297 mothers, and as eye-drops to 28 infants. Antibiotics other than penicillin and streptomycin were rarely used. Sulphonamides were often given to mothers but not to infants. The consumption of antibiotics did not change appreciably except for a temporary increase in the use of streptomycin early in 1956. This was followed by an increase in the proportion of streptomycin-resistant staphylococci, which amounted to 24·5% of the strains isolated between April and September, 1956, compared with 6·4% of the strains isolated previously.

TABLE I—PHAGE-GROUPS OF STAPHYLOCOCCI ISOLATED FROM INFANTS' UMBILICAL SWABS, NOSE SWABS, AND INFECTIONS, AND FROM NURSES' NOSE SWABS

Phage-group	Infants				Nurses' noses
	Umbilicus	Nose	Skin sepsis (except pemphigus)	Sticky eye	
I: Pattern 52A/79	8	40	9	6	38
" 80	1	9	6	0	13
" 29/52/52A/80 and 52/52A/80	12	72	6	14	31
Total	21	121	21	20	82
II	7	28	4	5	17
III	32	92	14	11	42
Miscellaneous	13	37	5	3	9
Non-typable	6	26	2	1	2
Total	79	304	46	40	152

More staphylococci were isolated from nose than from umbilicus, because the nose was swabbed repeatedly for several days and the umbilicus only on the 2nd day of life. But repeated isolations of the same strain from a particular infant's nose are not included.

Phage-patterns and Sources of Staphylococci

Most staphylococci isolated from infants belonged to phage-groups I and III (table I); these groups together contained 81% of all the penicillin-resistant strains which were typed. Most group-II strains were penicillin-sensitive. The groin was usually colonised by staphylococci from the infant's own umbilicus, and group-III strains were the most numerous in both these sites. This finding recalls the even greater predominance of group-III staphylococci in cross-infection among open surgical wounds (Gillespie 1957) and emphasises the fact that the umbilicus is itself an open wound which readily becomes colonised by staphylococci (Coventry and Isbister 1951, Jellard 1957b).

TABLE II—CLINICAL STAPHYLOCOCCAL INFECTIONS FROM NOV. 20, 1955, TO SEPT. 15, 1956, IN 842 INFANTS

Nature of infection	No.
Conjunctivitis	38
Pemphigus	11
Other skin infections:	
Simple pustule	37
Paronychia	4
Furuncle	4
Stye	2
Subcutaneous abscess	3
Total	99

Phage-group-I staphylococci were only slightly less numerous than group-III staphylococci on umbilicus and groin, and outnumbered them in the noses of infants. Group-I strains were even more numerous in the noses of nurses, many of whom had become carriers while previously working in general hospitals (table I). Thompson and Gillespie (1958) showed that nurses in general wards often became persistent nasal carriers of group-I penicillin-resistant staphylococci despite a preponderance of group-III strains in the wards.

The staphylococci varied in their ability to cause clinical infection. A type-71 (group-II) strain caused the only cases of pemphigus, in a short outbreak previously described by Gillespie et al. (1957). Other sepsis of the skin was caused more often by the group-I staphylococci 52A/79 and 80, in relation to their frequency of isolation from carrier sites, than by other staphylococci (table I). Further evidence of the virulence of these types is given below.

Staphylococci sometimes spread to the infants from nurses' noses—for example, the type-71 strain which caused the outbreak of pemphigus. Probably many staphylococci entered the nurseries in this way; but, once introduced, they usually spread from infant to infant without colonising the noses of nurses. The infants were themselves the most important immediate sources of infection, as many other workers have stated (Cunliffe 1949, Parker and Kennedy 1949, Hutchison and Bowman 1957, Forfar and Maccabe 1958).

The result of disinfecting nurses' hands, described below, showed that handling by a common staff was an important means of transferring staphylococci from infant to infant. Strains similar to those prevalent among infants were isolated more often from the hands than the noses of nurses.

From time to time, a bacteriological "epidemic" was caused by a particular strain which spread widely among the infants as described by Jellard (1957b), often causing little or no clinical infection, and recognised only by phage-typing.

Although most staphylococcal cross-infection was caused by penicillin-resistant strains, this was not always so. A phage-type-70 staphylococcus, which was sensitive to penicillin and the other antibiotics, spread to 17 infants in one nursery in a period of two months, without colonising a nurse's nose. The original source of the strain was not discovered. Its sensitivity to penicillin suggested

that it might have come from a mother, since 70 of the 94 staphylococci isolated from mothers' noses were penicillin-sensitive. But mothers were not important sources of the staphylococci which spread in nurseries. In this respect our experience resembled that of others (Allison and Hobbs 1947, Cunliffe 1949, Parker and Kennedy 1949, Ludlam 1953).

Clinical Infection

Between Nov. 20, 1955, and Sept. 15, 1956, staphylococcal lesions developed in 99 (11·8%) of the 842 full-term infants, mostly in the 2nd week of life (table II). We did not determine how many infections developed after the infants left hospital.

There were no cases of staphylococcal pneumonia.

It was difficult to determine how often the staphylococci isolated from inflamed eyes had caused the inflammation. Only 48% of the swabs from "sticky eyes" yielded *Staph. aureus*. Most of the negative swabs came from infants in the first few days of life whose eyes were

TABLE III—PHAGE-GROUPS OF STAPHYLOCOCCI ISOLATED FROM INFANTS' NASAL AND UMBILICAL SWABS ON THE 2ND DAY OF LIFE AND FROM SKIN INFECTIONS WHICH DEVELOPED LATER IN THE SAME INFANTS

Phage-group	Nose positive, umbilicus negative		Nose negative, umbilicus positive		Nose and umbilicus positive	
	No. of infants	Lesions	No. of infants	Lesions	No. of infants	Lesions
I: Pattern 52A/79	9	1	8	2 (1)	9	7
" 80	3	0	3	1	5	2
" 29/52/52A/80 and 52/52A/80	12	0	7	0 (1)	6	1
Total	24	1	18	3 (2)	20	10
II	6	0	9	0 (1)	3	0
III	27	0	26	0 (2)	15	1 (1)
Miscellaneous and Non-typable	13	0	20	1	6	1
Total	70	1	73	4 (5)	44	12 (1)

The table does not include the type-71 (group II) strain which caused an outbreak of pemphigus (see text).
The figures in parentheses are the numbers of infections caused by staphylococci other than the strains isolated from the infants' second-day swabs.

only slightly inflamed, but a few severely inflamed eyes also gave negative swabs. Evidently staphylococci were sometimes present as secondary invaders (Barber et al. 1953, Hutchison and Bowman 1957); but when numerous they were probably responsible for the conjunctivitis.

Many of the skin infections were mild, and, apart from one outbreak of pemphigus which has been described previously, consisted mainly of pustules. Pustules were commonest in areas subjected to rubbing, in creases of the neck, axilla, and groin, from which they sometimes spread to the lower abdomen, and also on the thighs at the level of the lower edge of the napkin. Boils and subcutaneous abscesses usually occurred over the parietal eminences and in the breast, whilst paronychiæ afflicted a few hungry infants who sucked their fingers.

Infants who became heavy staphylococcal carriers by the 2nd day of life subsequently developed skin sepsis more often than others. Of 55 infants whose 2nd-day nose and umbilical swabs both yielded *Staph. aureus* on direct plating, 11 (20%) developed pustules later, compared with 6 (1·4%) of 437 infants whose nose and umbilical swabs were either negative or yielded staphylococci only after enrichment culture in salt broth. The difference was highly significant ($\chi^2=50·8$; $P<0·001$). The effect of colonisation of the umbilicus alone was much less pronounced; pustules developed in 6 (3·2%) of the 185 infants whose umbilical swabs, but not nose swabs, yielded staphylococci by direct plating, on the 2nd day of life. The difference between the incidence of sepsis in this group and in the group with negative umbilical and nose swabs was not statistically significant ($\chi^2=2·4$; $P>0·1$).

Infants with positive nose swabs and negative umbilical swabs were too few for comparison with the others.

The incidence of sepsis after early, heavy colonisation varied with different staphylococci. It was greater with the phage-group-I strains 52A/79 and 80 than with other strains in the same or other groups, especially when both sites were colonised (table III). Of 14 infants whose nose and umbilicus were both colonised by the strains 52A/79 or 80, 9 (64%) developed skin sepsis caused by staphylococci with phage-patterns similar to the colonising strains (table III).

PREVENTION

Three methods of reducing cross-infection were investigated: the disinfection of infants' blankets and garments, the use by nurses of a disinfectant hand-cream, and the application of a disinfectant powder to the umbilicus and surrounding skin.

Disinfection of Bedding and Garments

These articles had always been laundered after use. On return, sheets and other non-woollens were almost sterile; but blankets, woollen vests, and jackets still contained many bacteria, including staphylococci.

From the beginning of April, 1956, blankets and garments were disinfected during laundering with 'Cirrasol OD' (Blowers and Wallace 1955). The process has been continued ever since, without injury to bedding or irritation of skin. By April 20, 1956, all articles had been satisfactorily treated. "Sweep plates" of nutrient agar containing 'Perminal COL' (Blowers and Wallace 1955) were taken from 161 of the blankets laundered during the next fourteen weeks and had an average of 20·4 colonies per plate, compared with an average of 157 colonies from 226 blankets laundered previously. There was a similar reduction in sweep-plate counts from garments. The number of staphylococci isolated from laundered blankets fell from 0·40 colonies per plate before April 20 to 0·09 colonies per plate afterwards; the real reduction was probably greater, since staphylococci were sometimes difficult to detect in crowded plates.

"Settle-plates" showed evidence of a reduction of the dust-borne staphylococci in the air when blankets were disinfected. Before April 20 there was an average of 2·8 staphylococcal colonies per plate, and in the next fourteen weeks 1·6 colonies per plate. The reduction persisted throughout the following winter and probably was not caused by better ventilation in the summer months.

The disinfection of bedding had no detectable effect on staphylococcal cross-infection or on the incidence of staphylococcal sepsis. In the fourteen weeks after April 20, 44 (44%) of 99 2nd-day nose swabs were positive, compared with 64 (42%) of 152 taken previously. The corresponding figures for positive 2nd-day umbilical swabs were 84/137 (61%) after April 20 and 64/111 (58%) previously. Staphylococcal skin pustules occurred in 17 (6·0%) of 283 infants born after April 20, compared with 22 (5·3%) of 416 born previously.

Disinfectant Hand-cream

Murray and Calman (1955) showed that the application of a cream containing 1% chlorhexidine reduced the numbers of bacteria on the hands. They stated that its use by nursery staff was followed by a reduction of infection among infants, but they did not give statistical evi-

dence. Cook et al. (1958) found that the use of chlorhexidine cream by nursery staff was accompanied by a slight reduction of nasal carriage by infants.

On Sept. 16, 1956, chlorhexidine hand-cream was brought into use on the 2nd floor, and a dummy cream, made of the same base, on the 3rd floor of the hospital. The nurses were asked to rub about $^1/_2$ in. (0·5 g.) of the cream into their hands after every washing, while on duty. It took some time to establish the routine; but after a few weeks hand swabs showed a satisfactory effect. The swabs were plated on nutrient agar containing 1% 'Lubrol W' and 0·5% lecithin, in order to neutralise residual chlorhexidine (as recommended by Imperial Chemical Industries, Ltd.). From Nov. 4, 1956, until June 22, 1957, 137 hand swabs from nurses using chlorhexidine gave total counts averaging 40·6 colonies per plate, and 23 (17%) of the plates contained *Staph. aureus*; whilst 148 swabs from nurses using dummy cream gave an average of 109·2 colonies per plate, 61 (41%) of which contained *Staph. aureus*. On July 7, 1957, the creams were exchanged, and from then until Jan. 24, 1958, dummy cream was used on the 2nd floor and chlorhexidine cream on the 3rd. During this period hexachlorophane ('Cidal') soap was used on the 3rd floor, and a non-disinfectant soap elsewhere as before. The exchange was followed by a reduction in the numbers of bacteria, including staphylococci, isolated from the hands of the 3rd-floor nurses, and a corresponding increase on the 2nd floor. The additional use of cidal soap made no appreciable difference.

The assessment of the effect of the hand-cream on cross-infection was inadvertently complicated by a change which was made in the method of dressing the umbilicus of some infants, and which was not part of our investigation. From Nov. 20, 1956, the cord of every second infant was dressed with zinc-oxide dusting-powder and covered with a pad and binder, while the cords of the others were, as before, treated with collodion and left uncovered. Fortunately the change was made simultaneously in both nurseries, and we were able to ensure that no further change was made during the trial of the hand-cream. The use of chlorhexidine cream by nurses was accompanied by a moderate reduction in staphylococcal cross-infection among infants (table IV). The reductions in the proportion of positive swabs when chlorhexidine cream was used, and the increase when it was withdrawn, were statistically significant, except for the reduction of nasal carriage in nursery 2.

Owing to the already low incidence of sepsis, it was difficult to assess the clinical value of chlorhexidine cream. When it was used in nursery 2 the incidence of skin sepsis fell, and rose again when dummy cream was used (table IV). There was no apparent effect in nursery 3.

Disinfectant Powder

The importance of the umbilicus as a source of staphylococci suggests that it should be protected from colonisation by these organisms. Jellard (1957a) reduced staphylococcal cross-infection and airborne contamination by applying triple dye to the umbilicus, and Cook et al. (1958) also found that this procedure reduced nasal carriage among infants.

The study of staphylococcal carriage in adults by Hare and Ridley (1958) suggests that colonisation of other parts of the body-surface besides the umbilical area might be an important factor in cross-infection among infants. If so, a disinfectant which could be applied to a wide area of the body as well as to the umbilicus might give better results than disinfection of the umbilicus alone. The frequency with which we previously had obtained heavy growths of staphylococci from the groin, and the results of a preliminary investigation of other skin areas, strengthened this belief. In nursery 3, 8 infants were swabbed every second day from nose, axilla, umbilicus, groin, perineum, and back of knee. 1 infant became heavily colonised in all six sites and another in five sites, with profuse growth of *Staph. aureus* on direct plating of the swabs. Altogether, 4 of the 8 infants became heavy perineal carriers. The perineum of 1 infant was colonised before any other site, and the perineum of another was colonised before its umbilicus.

Farquharson et al. (1952) reported a reduction in clinical staphylococcal infection following the use of a solution of hexachlorophane for bathing infants, but did not determine its effect on staphylococcal colonisation. Baldwin et al. (1957) showed that the addition of hexachlorophane to infants' baths reduced the colonisation of their noses and groins and also reduced the number of staphylococci on ward furniture. Hexachlorophane has been found to kill staphylococci in adults' bath-water and is used for this purpose in some wards (V. G. Alder, G. A. J. Ayliffe, and W. A. Gillespie, unpublished). We therefore decided to study the effect of dusting the umbilical area with a powder containing hexachlorophane ('Ster-Zac' baby powder). We used it first in the premature-baby nursery, where the routine treatment of the umbilicus

TABLE IV—THE EFFECT OF CHLORHEXIDINE TREATMENT OF NURSES' HANDS ON STAPHYLOCOCCAL COLONISATION AND SKIN SEPSIS IN INFANTS

Nursery	Period	Nurses' hand-cream	Infants' 2nd-day Swabs (positive/total)			Skin sepsis*	
			Nose	Umbilicus	Groin	No. of infants	Infections
2	Nov. 20, 1955, to Sept. 15, 1956	None	76/174 (44%)	112/172 (65%)	119/200 (60%)	491	35 (7·1%)
			P >0·1	P <0·001	P <0·001		
	Nov. 4, 1956, to June 22, 1957	Chlorhexidine	64/179 (36%)	61/179 (34%)	61/179 (34%)	416	12 (2·9%)
			P <0·001	P <0·001	P <0·001		
	July 7, 1957, to Jan. 24, 1958	Dummy	83/146 (57%)	92/145 (63%)	80/146 (55%)	365	19 (5·2%)
3	Nov. 20, 1955, to Sept. 15, 1956	None	50/112 (45%)	57/115 (50%)	58/124 (47%)	351	15 (4·3%)
			P >0·1	P >0·2	P >0·2		
	Nov. 4, 1956, to June 22, 1957	Dummy	41/113 (36%)	47/113 (42%)	45/112 (40%)	283	8 (2·8%)
			P <0·01	P <0·01	P <0·001		
	July 7, 1957, to Jan. 24, 1958	Chlorhexidine	17/89 (19%)	22/87 (25%)	15/88 (17%)	229	8 (3·5%)

The probability values (P) were obtained by the chi-square test.
*Outbreak of pemphigus not included (see text).

was to trim the cord to about ¾ in. (2 cm.), within 6 hours of birth, and to spray it with 'Octaflex' which on drying forms a water-permeable plastic skin. This basic treatment was continued except for a period of six weeks when octaflex was replaced by collodion, which, however, was found to be slightly inferior, as judged by the results of umbilical swabs. From Oct. 7, 1957, until March 25, 1958, the cord and surrounding skin of every second premature infant was powdered immediately after applying the plastic dressing, and subsequently whenever the napkin was changed, until the cord separated. Umbilical swabs were taken from every infant before the cord was dressed for the first time, and again at intervals of two days. Swabs were plated on nutrient agar containing 1% of 'Tween 80', to neutralise hexachlorophane transferred on the swab (Bolle and Mirimanoff 1951). Enrichment culture in salt-broth was not used.

The use of hexachlorophane dusting-powder caused a pronounced reduction in staphylococcal colonisation of the umbilicus. The numbers of *Streptococcus fæcalis*,

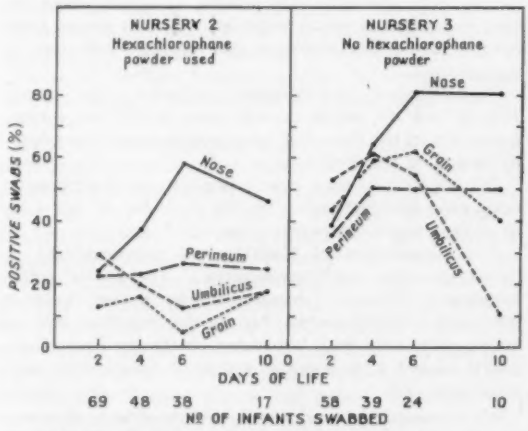

Fig. 2—Staphylococcal colonisation of infants in two nurseries, in one of which hexachlorophane powder was applied to the umbilical area.

micrococci, diphtheroids, and coliform bacilli were reduced by smaller amounts. Of 22 treated infants 3 acquired *Staph. aureus* on the umbilicus at an average age of 6 days, compared with 13 of the 21 control infants at an average age of 4·5 days. The difference was significant (χ^2, corrected for small numbers, $=8{\cdot}71$; $P<0{\cdot}01$).

The results of a further small series showed that the disinfectant in the powder was necessary. A dummy powder gave no protection against staphylococcal colonisation.

The effect of the new umbilical treatment on staphylococcal cross-infection was studied in nursery 2, where from Feb. 26, 1958, the cords of all infants were trimmed and dressed with octaflex, usually within 6 hours of birth, and then repeatedly dusted with hexachlorophane powder as described above. Swabs were taken from the nose, groin, perineum, and umbilicus of many infants on the 2nd, 4th, 6th, and 10th days of life.

There was a pronounced fall in the proportion of positive 2nd-day swabs from nose and groin as well as umbilicus, to less than half of the previous values. The change was chiefly due to a reduction in the number of carrier sites which became heavily colonised by staphylococci. This was shown by comparing the proportions of swabs giving growths of *Staph. aureus* on direct plating (omitting swabs positive only after enrichment culture in salt-broth) in the periods before and after the introduction of hexachlorophane powder in nursery 2 (table v). Nasal carriage increased with age, despite the use of hexachlorophane (see fig. 2); but the increase was slower, and reached a lower final value than in the earlier period shown in fig. 1.

TABLE V—EFFECT OF DUSTING UMBILICUS WITH HEXACHLOROPHANE POWDER ON THE PROPORTION OF CARRIER SITES BECOMING HEAVILY COLONISED BY THE 2ND DAY OF LIFE

Carrier sites swabbed	Method of cord dressing			
	Old (July 7, 1957, to Jan. 24, 1958)		New (with hexachlorophane) (Feb. 26 to July 31, 1958)	
	Total	Positive	Total	Positive
Nose ..	145	50 (34%)	139	17 (12%)
Groin ..	145	60 (41%)	139	6 (4·3%)
Umbilicus	144	74 (51%)	139	11 (7·9%)

Only swabs yielding *Staph. aureus* by direct plating, without enrichment culture in salt-broth, were counted as positive.

The effect of using hexachlorophane powder was also demonstrated by comparing nurseries 2 and 3, where from May 19 to July 31, 1958, the umbilical cords of all infants in both nurseries were treated similarly, except that hexachlorophane was restricted to nursery 2. All swabs which yielded *Staph. aureus* were counted as positive, including those with small numbers of staphylococci revealed only by enrichment culture in salt-broth. The rate of staphylococcal colonisation of nose, perineum, groin, and umbilicus were much less in nursery 2, where the powder was used, than in nursery 3 (fig. 2). The difference was made more striking by the fact that the normal rate of colonisation had previously always been higher in nursery 2.

Comparison of the results in the two nurseries suggests that disinfection of the umbilicus sometimes protected the perineum (as well as the nose and groin) from colonisation by staphylococci, and therefore that staphylococci from the umbilicus sometimes colonised the perineum. But the perineum was sometimes colonised from other sources, for some infants gave positive perineal swabs before their umbilical swabs became positive. The antiseptic powder therefore might have given better results if it had been applied to the buttocks and perineum and perhaps the axilla and other parts, as well as to the umbilical area. This possibility will be investigated later.

The effect of hexachlorophane dusting-powder on the incidence of staphylococcal sepsis cannot yet be finally assessed, but the results so far have been promising. In the six months before it was used 19 (5·2%) of the 365 infants in nursery 2 developed staphylococcal lesions of the skin, compared with 6 (2·0%) of 300 in the subsequent five months. In another maternity hospital where there were more type-80 staphylococci than in this, the use of the powder was followed by a notable reduction of sepsis in infants and of breast abscesses in mothers (Beryl D. Corner, S. T. Crowther, and T. E. Oppé, personal communication). These results will be fully reported later.

Discussion

Many infants became carriers of staphylococci soon after birth, and were then the chief sources from which staphylococci spread to other infants. Contact by nurses was an important mode of spread, as was shown by the reduction in cross-infection which followed their use of disinfectant hand-cream.

The umbilicus was an important carrier site, from which staphylococci often spread to other parts of the same infant as well as to other infants. But other sites were also important—notably the nose, groin, and perineum. The nose, more often than the umbilicus, harboured the group-I strains which caused most sepsis. Simultaneous colonisation of nose and umbilicus led to clinical infection more often than colonisation of either site alone. Nasal carriage was usually more persistent than umbilical carriage, and thus probably played a larger part in the dissemination of " hospital " staphylococci into the general population.

The incidence of sepsis was small in comparison with the amount of latent, " bacteriological " cross-infection. Most infants who became staphylococcal carriers suffered no harm. Nevertheless, the earlier and more widely an infant became colonised by staphylococci, the more likely was he to develop sepsis later. The risk was greatest when the colonising staphylococcus was a strain with the phage-pattern 52A/79 or 80, both of which caused more sepsis than other members of group I or of other groups. Penicillin-resistant 52A/79 strains were previously found to be frequent causes of furunculosis among nurses in our general wards (Alder et al. 1955). Type-80 staphylococci fortunately never became numerous. If they had, sepsis might have been more frequent and more severe (Rountree and Freeman 1955, Duthie 1957, Gillespie and Alder 1957).

In an analysis of staphylococci responsible for many different outbreaks of infection, Williams (1957) states that group-I strains were much more frequent in maternity-hospital outbreaks than in surgical-ward outbreaks. Our experience has been similar. But although group-III strains caused less sepsis they were also numerous, and in fact outnumbered group-I strains in cultures from the umbilicus. It is interesting that group-III staphylococci, which often predominate in open surgical wounds, should also predominate in the umbilical " wound".

The existence of several sources and modes of spread of staphylococci often makes it difficult to decide how best to tackle the problem of reducing cross-infection. In maternity hospitals, the most important step seems to be the prophylactic treatment of carrier sites on the infants themselves, starting as soon as possible after birth, in order to protect them from colonisation by staphylococci. In this way the total " load " of infection may be reduced, and the infants protected from the sepsis which, as we have shown, often follows heavy colonisation in the first day or two of life. The application of a dusting-powder containing hexachlorophane to the umbilicus and surrounding skin greatly reduced staphylococcal colonisation and cross-infection. The powder was easy to use and did not irritate the skin. It would probably give better results if applied to a wider area of the body, including the perineum, groins, and axillæ, and this could easily be done. Better results might also be obtained by bathing the infants in water containing hexachlorophane, and applying the powder, before they leave the labour ward.

The prophylactic application of antiseptic ointment to the anterior nares of adult inpatients has been found to prevent nasal carriage of staphylococci (Gillespie 1957). This precaution might also be of value in infants, but has yet to be investigated.

Precautions which reduce the transfer of staphylococci from infant to infant are also important, though probably less so than the prevention of heavy colonisation of their main carrier sites. Handling by a common nursery staff is the chief mode of transfer of staphylococci; and this might be reduced, if circumstances permit, by keeping the infants with their mothers. The use of chlorhexidine hand-cream by nursery staff should be a useful adjunct to other precautions and would be justified if the incidence of sepsis were high.

It was surprising to find that the disinfection of blankets and garments had no effect on cross-infection. It is sometimes suggested, but difficult to prove, that staphylococci when dried in dust or blankets are less virulent than when transferred direct from a lesion or a carrier site. Nevertheless, the disinfection of blankets was not necessarily valueless. If the other sources of staphylococci had first been reduced, blankets might have been found to play a significant part in cross-infection.

Summary

Staphylococcal cross-infection among infants in a maternity hospital was studied for over two and a half years.

Most infants quickly became colonised by *Staph. aureus*, and were then the chief sources of infection of others. The umbilicus was usually colonised before the nose and groin, to which staphylococci often spread from the umbilicus. The perineum also was often colonised by staphylococci.

Phage-group-I staphylococci, including the strains 52A/79 and 80 which caused most sepsis, were most numerous in the nose, but were outnumbered by group-III strains on the umbilicus.

Infants who became heavy staphylococcal carriers in both nose and umbilicus by the 2nd day of life later developed sepsis more often than other infants.

The disinfection of blankets and garments had no detectable effect on cross-infection. The use of chlorhexidine (' Hibitane ') hand-cream by nurses caused a moderate reduction, while dusting the umbilicus and the surrounding skin with a powder containing hexachlorophane caused a pronounced reduction in staphylococcal cross-infection.

We are grateful to the consultants who allowed us to study their patients, and to the matron and nursing staff, Bristol Maternity Hospital, for their help. We thank the Board of Governors, United Bristol Hospitals, for a grant which enabled us to do this work; Dr. G. Herdan for help with statistics; Imperial Chemical Industries (Pharmaceuticals) for supplies of ' Hibitane ' and dummy cream; and Messrs. Hough, Hoseason and Co. for ' ZAC ' hexachlorophane baby powder and dummy powder.

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A STAPHYLOCOCCUS TYPE-80 EPIDEMIC IN A MATERNITY HOSPITAL

ILLUSTRATING SOME SPECIAL FEATURES

MORAG C. TIMBURY
M.B. Glasg.
REGISTRAR, DEPARTMENT OF BACTERIOLOGY, UNIVERSITY OF GLASGOW

T. S. WILSON
M.D. Glasg. D.P.H., D.I.H.
DIVISIONAL MEDICAL OFFICER,
HEALTH AND WELFARE DEPARTMENT, GLASGOW

J. G. P. HUTCHISON
M.D. Lond.
LECTURER, DEPARTMENT OF BACTERIOLOGY, UNIVERSITY OF GLASGOW

A. D. T. GOVAN
M.B. Glasg., Ph.D. Birm., F.R.F.P.S., F.R.C.P.E.
DIRECTOR OF RESEARCH, ROYAL MATERNITY HOSPITAL, GLASGOW

MANY outbreaks of staphylococcus infection in maternity hospitals have now been fully and admirably described—for example, by Benians and Jones (1929), Allison and Hobbs (1947), Barber et al. (1949), and Munro and Markham (1958). The general picture is well known. The present epidemic seems worth recording because of certain features which we were fortunate in being able to delineate more clearly than is often possible.

Firstly, a bacteriological survey by phage-typing of most staphylococcal infections in the hospital had been instituted five months before the epidemic type appeared. Secondly, the epidemic strain was the exceptionally virulent phage-type 80 whose effects were first described in Australia by Rountree and Freeman (1955) and later by workers in the United Kingdom and the United States of America (Duthie 1957, Gillespie and Alder 1957, Ravenholt et al. 1957, Shaffer et al. 1957, Wysham et al. 1957). Thirdly, the introduction of this type to the hospital was closely followed by a sudden and dramatic increase in the severity of infections among the babies. Fourthly, the lessons learned from the clinical and laboratory findings were greatly enhanced by an epidemiological inquiry into events within the hospital and at the homes to which mothers and babies were discharged. This revealed the extent of infection in the babies which was undetected at the time of their discharge home. Lastly, the early closure of the hospital was completely successful in arresting spread of infection.

The Hospital

The epidemic broke out in a maternity hospital with 120 beds divided into three separate units. Babies normally stay beside their mothers' beds in the postnatal wards but are taken to the nurseries, which are attached to each unit, for bathing or changing or if they are noisy.

THE SICK NURSERY

The hospital has a sick nursery which is run by pædiatricians, and to which ill or premature babies from all three units are admitted. Both before and during the epidemic there appeared to be more infections in the sick nursery than in the babies being nursed in the units. This impression may have been due, to some extent at any rate, to the routine bacteriological investigations which are carried out on even the mildest infections in the sick nursery. For this reason, and also because of the better case-records kept there, our information about the infections in the sick nursery forms the substance of this account of the epidemic in the hospital.

Staphylococcal Infections before the Epidemic

Mild infections due to *Staphylococcus aureus* were common in the sick nursery before the epidemic. We were fortunate in knowing what strains had been causing these infections because the staphylococci isolated in the five months before the outbreak had been phage-typed. In practice only about 85% of these strains were actually submitted for typing, but failure to submit all strains was due to familiar human errors of one kind or another and no selection was involved.

Phage-typing showed that a variety of types had caused these infections, and although some strains were isolated from more than one infection none was really predominant. Type 80 was not isolated in the hospital during this period.

The Epidemic

Type 80 was first isolated on Nov. 19, 1957, from a submandibular abscess in a baby transferred to the sick nursery from one of the units. Thereafter until the hospital closed six weeks later, on Jan. 4, 1958, type 80 caused 14 of the 18 infections appearing in the sick nursery. During the epidemic period the incidence of all staphylococcal infections in the babies was 11%; the figure for infection due to type 80 was 8%.

Severity of Infections due to Type 80

The most noteworthy feature of the epidemic was the high case incidence of serious infections. In table I the infections during the epidemic period have been classified according to severity. " Minor " infections include skin pustules, conjunctivitis, inflamed umbilicus, and mouth sores. " Serious " infections include abscesses, pneumonia, and 1 case of osteitis. 9 of the 18 infections in the epidemic were serious infections; and all the serious infections were due to type 80. This high incidence of serious infection is especially significant since there had been very few such cases in the five months preceding the epidemic. 5 of the 9 babies who had serious infections died.

TABLE I—CLINICAL ASSESSMENT OF INFECTIONS IN SICK NURSERY DURING THE EPIDEMIC PERIOD (NOV. 19, 1957, TO JAN. 4, 1958)

Minor*		Serious*	
Type 80	Other strains	Type 80	Other strains
5	4	9 (5 fatal)	0

* 2 babies are included who had minor infections due to type 80 and subsequently developed serious infections, from which the organisms were not available for typing.

DEATHS ASSOCIATED WITH THE EPIDEMIC

8 deaths in all were associated with the epidemic. Complete bacteriological investigations were not possible in every case. The first 6 cases had been nursed in the sick nursery; cases 7 and 8 were nursed in the units.

Case 1.—A male child who had severe cerebral birth injury died on the 7th day of life, and type 80 was isolated from a blood-culture taken just after death. Postmortem examination showed a tentorial tear, cerebral hæmorrhage, enteritis, and bronchopneumonia.

Case 2.—A male child with cerebral contusion died on the 2nd day. Postmortem examination revealed tentorial bruising and right lower lobe pneumonia. Type 80 was isolated from a postmortem specimen of lung.

Case 3.—A premature female baby had a skin pustule on the 4th day from which type 80 was isolated. A scapular abscess developed but she made an apparent recovery and was discharged home on the 10th day. She died in another hospital 7 weeks after birth from bronchopneumonia; type 80 was isolated from the lungs at postmortem examination.

Case 4.—A male baby developed a skin pustule due to type 80 on the 6th day and subsequently paronychia and osteitis. He died on the 11th day; permission for postmortem examination was refused.

Case 5.—A premature female child developed conjunctivitis due to type 80 on the 5th day. She was transferred to another hospital on the 16th day and died on the 18th day. At postmortem examination death appeared to be due to enteritis and pneumonia. Type 80 was isolated in pure culture from the pleural fluid.

Case 6.—A premature female baby developed septic spots on the 6th day from which *Staph. aureus* was isolated but not phage-typed. She died on the 7th day, and postmortem examination showed right upper lobe pneumonia. No bacteriological cultures were made, but histological sections of lung showed clusters of gram-positive cocci.

Case 7.—A female child developed a skin pustule due to type 80 on the 9th day. She was transferred to another hospital on the 12th day with an axillary abscess due to type 80. After an apparent recovery she was discharged home but died 11 weeks after birth in a different hospital. Postmortem examination showed bronchopneumonia and type 80 was isolated from the lungs.

Case 8.—A female baby suffered from septic spots on the skin but was discharged from hospital, apparently well, on the 8th day. She died a week later in another hospital from multiple abscesses and bronchopneumonia from which *Staph. aureus* type 29/7 (1000 × R.T.D.) was isolated. This strain had caused a few sporadic infections in the hospital before the epidemic and was therefore probably acquired in the hospital.

NASAL CARRIAGE OF *Staph. aureus*

Staff

When the hospital was closed, nasal swabs were taken from 475 members of the medical, nursing, administrative, and domestic staffs. 38% were found to carry *Staph. aureus* in their nose, but only 0·6% (3 persons) harboured the epidemic strain. Of these 3, 1 was a maid who did not work in the wards and 2 were nurses. Both nurses had suffered from boils during although not before the epidemic. But 1 developed boils only in the last week of the outbreak and both went off duty when the boils appeared, so they should probably be regarded as victims of type 80 rather than its source. It was interesting to find that many nurses were nasal carriers of the strains of staphylococci which had caused infections before the epidemic started.

Babies

Unfortunately nasal carriage of *Staph. aureus* in the babies was not investigated on a large scale. In the fifth week of the epidemic nasal swabs were taken from 16 healthy babies in the units. *Staph. aureus* was isolated from the nose of 13 babies, and 3 were found to carry type 80. In relation to the clear predominance of the epidemic strain in infant infections, this was rather a low rate of nasal carriage in the infants.

STAPHYLOCOCCAL CONTAMINATION IN WARDS AND NURSERIES

When the hospital was closed numerous sites were sampled for *Staph. aureus:* these included dust from floors, curtains, screens, blankets, furniture, and equipment. *Staph. aureus* was isolated from many of the sites tested, but type 80 was found once only—in a communal blanket used during changes of infants' clothing in one of the unit nurseries. Several of the strains which had caused sporadic infections before the epidemic were isolated from sites in the nurseries. The failure to isolate the epidemic strain, which had been so predominant in infections in the sick nursery, was unexpected.

Infections after Discharge Home

Babies

While the hospital was closed, health visitors of the public-health department notified us of infections developing shortly after discharge from the hospital in babies born in the last two weeks of the epidemic period. In this way we discovered that 21 of 99 babies had developed infections at home. Nearly all these infected babies had been nursed in the units in the hospital. With the exception of 1 case of breast abscess all the infections were mild. 18 of these babies were visited at home about a month after their discharge from hospital and swabs were taken from their nose, umbilicus, lesion, and mother's nose. Swabs were taken from the lesions of a further 2 babies although nasal and umbilical swabs were not obtained.

The strains of staphylococci which were isolated from lesions in this investigation are shown in table II. 16

TABLE II—STAPHYLOCOCCI ISOLATED FROM INFECTIONS IN BABIES ONE MONTH AFTER DISCHARGE FROM HOSPITAL

No. of lesions swabbed	No. of lesions from which *Staph. aureus* was isolated			
	Total	Type 80	Other strains	
			Penicillin-resistant	Penicillin-sensitive
20	16	4	10	2

lesions yielded cultures of *Staph. aureus*, but only 4 were due to type 80. This is in striking contrast to the distinct predominance of type 80 in infections in the hospital, but is in accord with the type-80 nasal-carriage rate found in infants in the hospital. The strains other than type 80 which were isolated from these lesions belonged to a variety of phage-types; but 10 of the 12 strains were penicillin-resistant indicating that they, too, were probably acquired in hospital.

Nasal Carriage of Staph. aureus *in Babies and Mothers*

One month after discharge.—The results from the nasal swabs taken from babies and mothers in the survey are shown in table III. 17 of the 18 babies and 10 of the 16

TABLE III—NASAL CARRIAGE OF *Staph. aureus* IN INFECTED BABIES AND THEIR MOTHERS ONE MONTH AFTER DISCHARGE FROM HOSPITAL

No. visited	No. of staphylococcal nasal carriers		
	Total	Type 80	Other strains
Babies: 18	17	4	13
Mothers: 16	10	3	7

mothers from whom nasal swabs were obtained were staphylococcal nasal carriers. 4 babies harboured type 80; these were the same 4 babies who had infections due to type 80. 3 mothers carried type 80, and in each case their baby was infected with the same strain.

Four months after discharge.—Four months after the epidemic we visited all the babies who were known either to have been infected with or to have been nasal carriers of the epidemic strain. In this second survey nasal swabs were again taken from mothers and babies, and any history of infection in either was noted. The results are shown in table IV. The number of staphylococcal nasal carriers among both babies and mothers was much lower than in the previous survey a month after discharge. Thus 7 of 16 of the babies and 6 of the 16 mothers were staphylococcal nasal carriers. 2 babies and 3 mothers

TABLE IV—NASAL CARRIAGE OF *Staph. aureus* IN BABIES COLONISED OR INFECTED BY TYPE 80 AND THEIR MOTHERS FOUR MONTHS AFTER DISCHARGE FROM HOSPITAL

No. visited	No. of staphylococcal nasal carriers			No. with history of infection
	Total	Type 80	Other strains	
Babies: 16	7	2	5	6
Mothers: 16	6	3	3	4

harboured type 80. 6 babies and 4 mothers had a history of infection which clinically would be regarded as staphylococcal, but no bacteriological investigations had been carried out on the lesions.

Mothers

No systematic attempt was made to investigate infection in the mothers. 5 mothers were discovered by chance to have developed infections due to the epidemic strain, type 80. In 3 the infections were breast abscesses; in 1 impetigo and abscess of the hand; and in the 5th recurrent boils of the skin of the chest wall. This last case was discovered in the survey of infant infection carried out a month after discharge. In this survey another mother was found to have similar lesions due to a different strain of *Staph. aureus* which was also the cause of the baby's lesion.

The 4 mothers with a history of infection in the survey four months after discharge include the mother mentioned above who had boils of the skin of the chest wall due to type 80. She still carried type 80 in her nose, and in fact the boils had persisted on her chest and neck until within two weeks of the later survey. The other infections discovered in this survey were 2 cases of breast abscesses, and 1 case of stye of the eye. No bacteriological investigations had been carried out in these cases.

Reopening of the Hospital

On Jan. 4, 1958, the hospital was closed to new admissions and by Jan. 10 all patients had been transferred from it. The whole building was then thoroughly disinfected; all wards, duty rooms, labour wards, and operating-theatres were sprayed with 10% liquid formaldehyde and after a few days were washed down with water to give a second fumigation. All the equipment in operating-theatres and labour wards had been treated with carbolic-acid solution before the formaldehyde fumigation. The blankets, bed-linen, clothing, curtains, and screens were sterilised with steam under pressure. After eighteen days the hospital reopened (Jan. 22). No infections due to type 80 have appeared in the hospital during the six months since its reopening. Staphylococcal infections have been fairly common, but they have almost all been mild; staphylococci of many phage-types have been isolated from them—no one strain being predominant. The position with regard to infection in the hospital, therefore, is virtually the same as it was before the epidemic.

Discussion

Outbreaks of staphylococcal infection in maternity hospitals due to *Staph. aureus* of phage-type 80 have now been reported from many different parts of the world. Some workers—for example, Rountree and Freeman (1955) and Gillespie and Alder (1957)—noted that the infections caused by type 80 were unusually severe and that its rate of colonisation of the noses of hospital staff was low; they therefore regarded the strain as unusually virulent. Munro and Markham (1958), on the other hand, described an outbreak in which minor infections were common and severe complications rare, and in which the strain did not therefore appear to be unusually virulent.

In the outbreak which we describe the epidemic type-80 strain corresponded closely to the more virulent type of organism described by Rountree and Freeman and Gillespie and Alder. Clinically the epidemic was characterised by a sudden and alarming rise in the number of serious infections among the babies in the hospital concerned. Phage-typing showed that the strain had not been present in the hospital before the epidemic and that its appearance in infant infections coincided with this sudden increase in serious infections. There was no gradual build-up of infection due to the strain; it appeared quite suddenly as the predominant cause of infant infection and remained predominant until the hospital was closed six weeks later. Despite the fact that it caused 78% of the infections in the sick nursery (table I) the rate of nasal carriage in the staff and of colonisation of the environment of wards and nurseries was extremely low. The latter was a most unexpected finding, since Hutchison and Bowman (1957) showed that as soon as infants were colonised or had open sepsis the infecting strain could be found in the ward dust. It was most interesting that some of the strains of staphylococci which had caused the mild infections before the epidemic were isolated from many sites in the hospital, as well as from the noses of many nurses. It is, of course, quite possible that the property of enhanced virulence in a strain is not necessarily associated with the ability to colonise widely. In this epidemic the less virulent staphylococci appeared to have greater powers of colonisation than did the epidemic strain.

No vigorous attempt was made in the nurseries to control the infections. We doubt whether this could have been effective, in view of the absence of satisfactory isolation facilities at the time of the epidemic; this was due to overcrowding which was unusually great because the building was being altered. When a strain of staphylococcus becomes established as a major cause of dangerous infection without colonising widely, it seems unlikely that it could be eliminated by the measures usually recommended, which are mostly aimed at preventing widespread colonisation. Although the closure of the hospital and its subsequent disinfection were naturally unwelcome measures they were successful in eliminating the epidemic strain from the hospital.

In our surveys on infants and mothers after discharge we attempted to assess how far type 80 had spread outside the hospital. Despite considerable effort we probably detected only a part of the total picture. The nasal swabs taken from infants after discharge showed a decline in the staphylococcal nasal-carriage rate from 94% at one month (table III) to 44% at four months (table IV). In the survey four months after discharge only 2 babies and 3 mothers still carried type 80, although we had selected infants known to have been involved in the epidemic. There was therefore no evidence that type 80 persisted longer in the nose than any other strain, and the danger of its spreading widely in the general population as a result of this epidemic appeared to be small.

It was interesting to find that type 80 did not show such a clear predominance in infections at home as it had within the hospital. This, of course, may simply reflect the strain's low powers of colonisation, because its

prevalence in these infections, which was 25% (table II), corresponds closely to its prevalence in the infant staphylococcal nasal carriers in hospital (23%). But an unusually virulent staphylococcus would have been expected to cause disease more commonly than normally pathogenic staphylococci, and why this did not happen in babies discharged from hospital is not known. The incidental discovery that penicillin-resistant strains other than type 80 (which was resistant to penicillin and the tetracyclines) were causing infections in infants at home suggests that, even in the absence of the epidemic strain, hospital-acquired staphylococci would still be giving rise to a considerable amount of infection. This raises two interesting points. Firstly penicillin should never be used in these cases until the antibiotic sensitivity of the infecting organism has been determined. Secondly, these infants and their mothers may introduce antibiotic-resistant staphylococci into the general population.

It is clear that follow-up surveys are essential to determine the true extent of staphylococcal infection acquired in maternity hospitals; and this has been emphasised by American workers (Ravenholt et al. 1957, Wysham et al. 1957). Unfortunately it is very difficult to carry out follow-up surveys in this country. In the outbreak described by Ravenholt et al. inquiries were made by telephone about the subsequent progress of babies and mothers—a method which would, of course, be quite impracticable in the United Kingdom. Wysham et al. examined babies and mothers when they attended postnatal clinics. This might be a practical method of follow-up in this country, particularly if inquiries could also be made at child-welfare clinics. As things are, it is difficult for staff in maternity hospitals to be aware of the extent to which staphylococci acquired in hospital cause disease in babies and mothers after discharge. Our surveys show the possible extent of this kind of infection. We also discovered that 3 infants died of staphylococcal disease after they had been discharged home apparently well.

It is very doubtful whether these cases would have been traced to the hospital if we had not been making, with the cooperation of other bacteriologists in the area, an especial effort to discover cases of infection in these babies. We should certainly urge that serious staphylococcal infection appearing in infants after discharge be reported to the local health authority and the hospital where they were born. In attempting to solve the problem of infection in maternity hospitals, one of the first necessary steps is to discover by systematic inquiry into individual outbreaks the full extent of neonatal hospital-acquired staphylococcal disease as well as the phage-type and the possible source of the infection.

Summary

An outbreak in a maternity hospital of infection due to *Staphylococcus aureus* phage-type 80 is described.

The incidence of serious infections due to the epidemic strain was unusually high.

The nasal-carriage rate of type 80 among the staff, and the rate of colonisation of the hospital environment generally, was remarkably low.

There was evidence that staphylococci acquired in hospital—not only phage-type 80 but also other strains—caused infections in 21% of the babies born in the last two weeks of the epidemic period, shortly after their discharge home.

Babies known to have carried or to have been infected with type 80 were visited four months after discharge from hospital. There was no indication that the strain tended to persist unduly in the noses of these children.

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THE USE OF A STEROIDAL SPIROLACTONE IN THE TREATMENT OF ASCITES IN HEPATIC CIRRHOSIS

D. N. S. KERR
M.B. Edin., M.S. Wisconsin, M.R.C.P., M.R.C.P.E.
MEDICAL REGISTRAR

A. E. READ
M.D. Lond., M.R.C.P.
MEDICAL REGISTRAR

R. M. HASLAM
M.B. Lond., D.C.P.
BIOCHEMICAL REGISTRAR

SHEILA SHERLOCK
M.D. Edin., F.R.C.P., F.R.C.P.E.
PHYSICIAN AND LECTURER

DEPARTMENTS OF MEDICINE AND CHEMICAL PATHOLOGY, POSTGRADUATE MEDICAL SCHOOL OF LONDON, W.12

"It is true, almost to a proverb, that great drinkers die of a dropsy."—BUCHAN, 1797.

PATIENTS with cirrhosis of the liver have a tendency to accumulate extracellular fluid, usually in the form of ascites. When fluid is accumulating, these patients excrete very little sodium in the urine—often less than 1 mEq. per 24 hours—while their urinary potassium excretion remains relatively normal. This is the pattern found in hyperaldosteronism, and it has been shown that many patients with cirrhosis and ascites excrete abnormally large amounts of aldosterone in the urine (Axelrad et al. 1955, Chart and Shipley 1953, Duncan et al. 1956, Luetscher and Johnston 1954, Wolff and Koczorek 1955, Wolff et al. 1958). This excessive excretion may reflect overproduction of aldosterone which could be at least partly responsible for the intense sodium retention. Any measure that reduces the effects of this excess aldosterone should be helpful in controlling the fluid retention of cirrhosis.

Surgical adrenalectomy has been carried out with this rationale (Marson 1954, Giuseffi et al. 1957) and was followed by a partial remission in two patients with intractable ascites. A drug which antagonises aldosterone would therefore be expected to exert a similar beneficial, but not curative, action. So far the only available drug with this action has been amphenone, which antagonises the production of several adrenal hormones. For this reason it must be given with cortisone or its analogues, and its effects are not easily disentangled from those of the cortisone; but when the two are administered simultaneously some cirrhotics with ascites have a sodium and water diuresis (Summerskill and Crabbé 1957, Wolfe et al. 1957). The toxic effects of amphenone, and its scarcity, have severely limited its use.

Recently two compounds have been synthesised which in animal experiments have shown anti-aldosterone activity (Cella and Kagawa 1957). They are steroid-17-

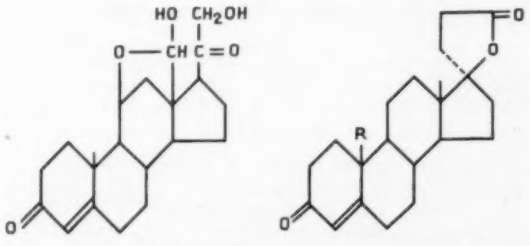

Fig. 1—The chemical formulæ of aldosterone and steroidal spirolactones.

spirolactones, designated SC 5233 and SC 8109 (fig. 1). In animals their actions are virtually identical but, weight for weight, SC 8109 has about three times the activity of SC 5233. The results of the use of SC 8109 in treating three patients with cirrhosis and ascites are now described.

The Investigation

Patients Studied

The three patients had Laennec's cirrhosis with ascites and two of them (patients 1 and 3) also had gross peripheral œdema (table I). In all three the ascites had proved

TABLE I—PATIENTS STUDIED

Patient	1	2	3
Sex	Male	Female	Male
Age	43	50	54
Ætiological factors	Unknown	Alcoholism	Alcoholism
Duration of ascites (months)	12	3	1
Serum-albumin (g. per 100 ml.)	2·3	3·5	2·9
Serum-sodium (mEq. per litre)	130	133	130

refractory to treatment with bed rest, dietary sodium restriction (22 mEq. per day), and mercurial diuretics. Patients 1 and 2 had also shown no response to chlorothiazide and triamcinolone, and repeated paracenteses were necessary. Patient 2 had continued to accumulate fluid while receiving intravenous salt-poor albumin infusions.

In all three patients portal hypertension was shown by splenomegaly and by radiological evidence of œsophageal varices. Patient 1 had previously experienced hepatic coma on two occasions.

Methods

The patients were studied in a metabolic ward. They received a daily diet of constant sodium (22 mEq.), potassium (100, 72, and 72 mEq. respectively), protein (50, 80, and 80 g. respectively) and fluid (1800 ml.) content. They were weighed daily, and urinary volume, sodium, potassium, and chloride were estimated. Urinary pH was measured on freshly passed urine at the same time each day in patient 3. Urinary antidiuretic hormone (A.D.H.) was measured by the technique of Bissett and Lee (1957) on 24-hour urine specimens before and at the end of the course of treatment. Plasma sodium, potassium, chloride, and bicarbonate levels were estimated three times a week. Blood-ammonium was estimated at the same intervals, on arterial blood taken in the fasting state, by the modified Conway procedure of White et al. (1955). Liver function (by routine tests) and blood-urea were estimated before and after treatment. The electroencephalogram was analysed by the method of Laidlaw (1958).

Patient 1 received a preliminary test of three intramuscular injections, each of 250 mg. of a microcrystalline suspension of SC 8109, in 24 hours. Fluid and potassium intake were not controlled during the preliminary test. The same suspension was then given to all three patients in courses of 250 mg. intramuscularly twice daily for 5 days.

Results

One-day Course

In patient 1 the one-day course of injections resulted in a rise in urinary chloride the day after administration, and this remained above the control level throughout the period of observation (fig. 2). Urinary sodium excretion rose from less than 1 mEq. per day to a maximum of 17 mEq. daily 10 days after treatment. It then declined, almost reaching the basal level 17 days after giving the drug. Urinary volume increased at about the same rate as the urinary sodium, from a daily mean of 450 ml. in the control period to 920 ml. during the period of maximum natruresis.

Five-day Course

During the five-day course in patients 1 and 3 there was an increase in sodium output, starting within 24 hours of administration of the drug, and reaching a peak at 6 and 5 days respectively (figs. 3 and 4). At the same time urinary volume increased about 500 ml. per day above the control level. In patient 3 this was sufficient to cause a slight temporary fall in weight, but patient 1 continued to gain weight though less rapidly than before treatment. Patient 2 showed a scarcely perceptible rise in urinary sodium output to 1·9 mEq. per day on the 5th day of treatment, and a simultaneous rise in urinary output of about 300 ml. per day; she continued to gain weight rapidly throughout the period of observation (fig. 5). Urinary potassium excretion rose slightly in patient 3 but there was no significant change in patients 1 and 2.

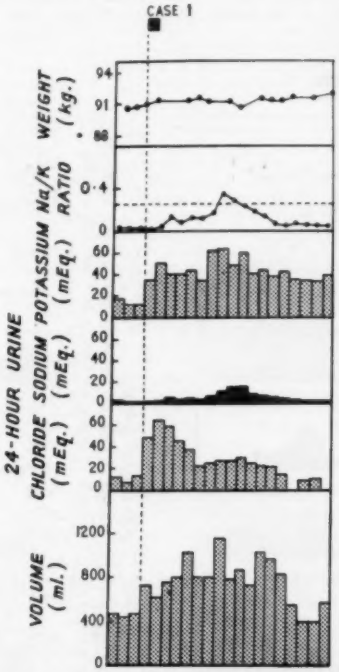

Fig. 2—Effect of one-day course of intramuscular SC 8109 on weight, urine volume, and electrolyte excretion in patient 1. In this and subsequent figures the sodium/potassium ratio of the diet is indicated by a horizontal broken line.

Urinary chloride excretion in patient 1 rose from a control level of 10 mEq. to a peak of 44 mEq. per day at the time of maximum natruresis. A similar but smaller rise was noted in the other patients (fig. 3). In patient 3 the urinary pH fell slightly—and probably not significantly—during treatment.

Before treatment, patient 2 was excreting no excess of A.D.H. in the urine. Patients 1 and 3 excreted excessive amounts of A.D.H. before treatment, but not at the time of maximum diuresis. In patient 3, urinary A.D.H. was estimated again at the end of the observation period, and

was again excessive (Lee 1958, personal communication).

Plasma sodium, potassium, chloride, and bicarbonate levels did not change significantly after treatment. Blood-ammonia levels showed considerable day-to-day variation in patient 1 who had a history of hepatic coma and showed a similar variation on other therapies. No significant change occurred in patients 2 and 3 (table II). None of the patients showed any deterioration in neurological status and the electroencephalograms did not alter.

No important changes were noted in serum-bilirubin, alkaline-phosphatase, zinc-sulphate and thymol-turbidity tests, but a slight fall in serum-albumin occurred in patients 1 and 3. The blood-urea rose from 54 to 78 mg. per 100 ml. in patient 2 and was unaltered in the other two patients.

On several occasions considerable pain was felt for some hours at the intramuscular injection sites. No albuminuria, hæmatological complications, or other toxic effects were noted.

TABLE II—ARTERIAL BLOOD-AMMONIA LEVELS

—	Blood-ammonia levels (μg. per ml.)			
Day of treatment ..	Control	5	10	15
Patient 1	1·5	1·0	1·5	1·3
Patient 2	1·3	1·8	1·5	1·3
Patient 3	0·9	0·8	0·6	0·5

Discussion

There is substantial evidence that SC 8109 in the rat and the dog acts as an inhibitor of aldosterone (Cella and Kagawa 1957, Kagawa et al. 1957, Liddle 1957). It has no action on adrenalectomised animals without replacement therapy, but in such animals it antagonises injected desoxycorticosterone (deoxycortone) acetate and aldosterone. Both the sodium-retaining and potassium-losing effects are inhibited.

The actions of SC 8109 in man have been studied in patients with Addison's disease (Liddle 1958). When no replacement therapy was being given, SC 8109 had no effect on the excretion of sodium, potassium, chloride, phosphate, ammonia, or titratable acidity. When given during deoxycortone therapy, it reversed the effects of deoxycortone by increasing excretion of water, sodium, and chloride and decreasing excretion of potassium, phosphate, ammonia, and titratable acid. Normal subjects on high sodium intake were unaffected by SC 8109 and SC 5233, but when high urinary output of aldosterone was induced by feeding them a low-sodium diet, they responded to the steroidal spirolactones in the same manner as addisonian patients receiving deoxycortone. The output of aldosterone, 17-ketosteroids, and 17-hydroxycorticosteroids were unaffected. These findings suggest that the drug acts as a peripheral inhibitor of aldosterone, and does not affect the production of aldosterone or other hormones by the adrenals.

In primary hyperaldosteronism, steroidal spirolactones cause an increase in sodium and water excretion without much change in potassium excretion (Salassa 1958, Luetscher 1958, Luetscher and Lieberman 1958); there may be an increase in the urinary excretion of aldosterone. In view of this strong evidence that steroidal spirolactones act as specific aldosterone inhibitors, they have been administered to a number of patients with œdema associated with secondary hyperaldosteronism due to congestive cardiac failure and nephrosis (Liddle 1958). Most of these patients responded with a sodium and water diuresis, and the unchanged or reduced excretion of potassium and the reduced excretion of ammonia and

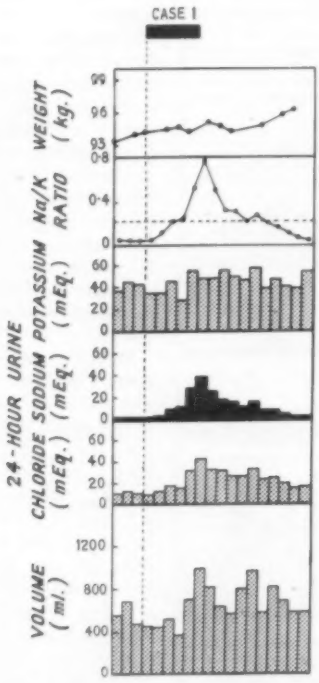

Fig. 3—Effect of five-day course in patient 1.

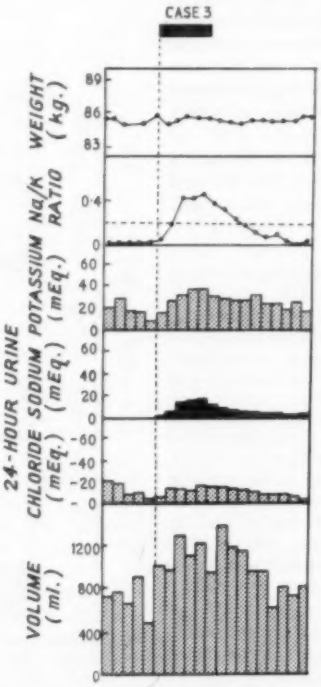

Fig. 4—Effect of five-day course in patient 3.

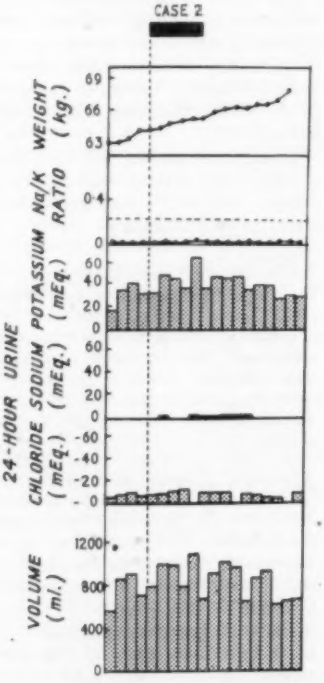

Fig. 5—Effect of five-day course in patient 2.

titratable acid confirmed that this was due to aldosterone inhibition.

Our three patients with cirrhosis and ascites were of the type in whom excessive aldosterone excretion is constantly found. In two patients SC 8109 induced a sodium diuresis, with accompanying loss of water and chloride; potassium excretion rose slightly or remained the same. The slight changes in potassium excretion were overshadowed by the increased sodium excretion, and at the time of maximum natruresis the urinary sodium/potassium ratio rose to about twenty times the control level. These observations are compatible with the view that SC 8109 acts by peripheral antagonism of aldosterone. During the period of presumed aldosterone inhibition the excretion of excessive amounts of A.D.H. ceased. This suggests that the overproduction of aldosterone and of A.D.H. may be interdependent.

The lack of any significant increase in the loss of potassium during treatment with SC 8109 may be correlated with the absence of clinical or electroencephalographic evidence of mental deterioration in these patients. The frequent occurrence of hepatic coma when chlorothiazide is used in the treatment of ascites in patients with cirrhosis is partly due to loss of potassium through the urine (Read et al. 1958).

There are several possible explanations for the failure of patient 2 to respond.

She may have failed to absorb the microcrystalline suspension from the intramuscular injection site; but in view of the consistent results with the other two patients this seems unlikely. An alternative explanation is that hyperaldosteronism was absent or unimportant in the maintenance of her œdema. Certain patients with cirrhosis and œdema treated with amphenone do not respond with a diuresis, and it has been suggested that other factors are responsible for maintaining fluid retention in these patients. Two of the œdematous patients treated by Liddle (1958) with steroidal spirolactones failed to show a response; both had high blood-urea and low urinary aldosterone levels. Patient 2 differed from the other two in having a raised blood-urea (54 mg. per 100 ml. before treatment and 78 mg. after treatment) and she did not excrete excessive amounts of A.D.H. She also, unlike the other two, failed to respond to intravenous albumin therapy—a regime that may act in part by inhibiting aldosterone production.

Even the two patients who responded to treatment with SC 8109 failed to lose a significant amount of weight. This is not surprising because the urinary sodium excretion exceeded the dietary intake on only 3 days in patient 1, and did not do so at all in patient 3. The small available supply of the drug made it impossible to give longer treatment, but in these two patients longer courses would probably have resulted in a greater total sodium and water excretion with consequent loss of weight and so clinical benefit. These patients were selected because they had proved resistant to standard treatment with salt restriction and diuretics, and SC 8109 therefore gives promise of being a valuable drug in the treatment of difficult cases of ascites. Unfortunately synthesis of the compound is tedious and costly and has not yet been undertaken on a commercial scale.

Oral administration of SC 8109 causes inhibition of aldosterone within hours (Liddle 1958). We therefore attribute the delayed response in our patients to slow absorption of the microcrystalline preparation from the intramuscular injection site. Preliminary trials with oily solutions of SC 8109 have shown more rapid absorption of the drug and these are likely to replace the present preparation.

The only toxic effects of SC 8109 so far described are drowsiness and ataxia when large oral doses (over 2 g. per day) are given (Liddle 1958). No toxic effects other than pain at the injection sites were noted in our patients.

Summary

A steroidal spirolactone SC 8109, known to antagonise aldosterone in laboratory animals, was administered to three patients with cirrhosis and intractable ascites. A sodium and water diuresis occurred in two patients while the third did not respond.

Intramuscular injection of the microcrystalline preparation resulted in slow absorption of the drug, the maximum effect being obtained about a week after starting treatment. Some drug action was still detectable two weeks after administration.

Pain at the injection site was common but no other toxic effects were noted.

The scarcity of the drug prevents full clinical trial at the moment, but the brief trials described here suggest that it will be useful in controlling ascites resistant to standard treatment.

We are grateful to Dr. G. R. Venning, of Messrs. G. D. Searle & Co., who kindly supplied the SC 8109 used in the trial; to Dr. Julian Lee of Charing Cross Hospital Medical School, who carried out the A.D.H. assays; to Dr. John Laidlaw, who reported the electroencephalograms; to Miss Janet McLaren for biochemical assistance; and to the Medical Research Council for help with expenses.

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Addendum

Since this paper was submitted, a further patient has received the microcrystalline preparation intramuscularly and showed an increased urinary sodium output but without loss of ascites. A preparation in sesame oil, said to be better absorbed than the microcrystalline form, has been given to two patients, and in both instances the sodium diuresis was associated with weight loss and clinical relief of œdema and ascites. Patient no. 2 (described above in text, fig. 5) received one injection of this preparation, and there was no significant increase in urinary sodium or volume, suggesting that poor absorption was not the main factor in her failure to respond to the microcrystalline preparation.

ESTIMATION OF BLOOD-UREA
A RAPID MICRO METHOD

D. WATSON
B.Sc. Lond., F.R.I.C., M.I.Biol.
PRINCIPAL BIOCHEMIST, DERBYSHIRE ROYAL INFIRMARY

D. A. H. PRATT
M.B. Lond., B.Sc. St. And.
RESIDENT CLINICAL PATHOLOGIST AT THE INFIRMARY*

IN recent years there has been a spate of activity to develop a rapid simple method for determining glucose levels in blood and cerebrospinal fluid (Lee 1954, Lancaster 1957, Osborn 1957, Davies and Paley 1957, Kohn 1957, Ek and Hultman 1958). Attempts to develop similar tests for estimating blood-urea levels have been less successful. Lawrie (1957) described a simple application of the xanthydrol reaction which gives approximate urea concentrations, but it involves venepuncture and subsequent separation of serum.

Experiments with crude urease preparations showed that the urea contained in a drop of blood could be converted almost instantaneously to ammonium salts. A simple procedure for estimating this ammonia concentration (Watson and Pratt 1958) has led to the development of the present more accurate method. The test is based on the production of a metallic stain when steam containing ammonia reacts with manganese and silver-nitrate solution on filterpaper.

Procedure for Capillary Blood

A drop of blood from an earprick is collected in a micropipette calibrated to deliver any fixed volume between 0·01 and 0·02 ml. The specimen is transferred to the bottom of a small tube (50 × 8 mm.) with rim, containing a trace of anticoagulant. A duplicate sample (reserve specimen) is also taken.

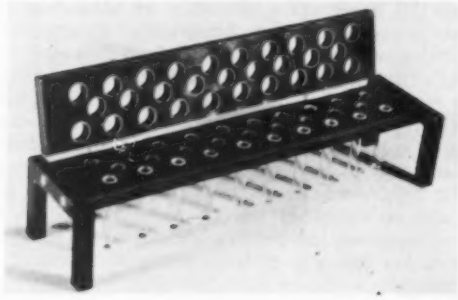
Using an identical pipette the same volume of standard urea solutions is measured into further tubes. Concentrations of 40, 55, 70, 85, 100, and 200 mg. urea per 100 ml. are suitable, although in emergency work the number of standards may be reduced. The blood and standard solutions are now transferred to a rack so that they hang by their rims. To each is added one drop of urease preparation.

After the rack has been shaken for ten seconds it is covered with a strip of filterpaper. One drop of indicator B is allowed to fall centrally on the paper over each tube, and the perforated lid clamped down by a bulldog clip.

The rack is now heated in a hot-air oven at 120°C ± 5°C. With small ovens the more uniform temperature at the top gives better results. After six minutes the circular deposits from the bloods are compared with those of the standards. Taking into account both size and intensity, an assessment to the nearest 10 mg. per 100 ml. is made. The 40 mg. standard should produce a light grey spot 1–2 mm. in diameter, and the 200 mg. standard a dark grey stain 8 mm. in diameter.

Blood containing less than 35 mg. per 100 ml. will produce no stain with this indicator. The reserve specimen can, however, be tested together with a range of standards between 15 and 40 mg. urea per 100 ml. using indicator A. Although a rough estimate of the urea levels in uræmic patients can be made with indicator B, a more accurate figure can be obtained using the more acid indicators C and D. These yield no stain with urea levels of less than 100 and 200 mg. per 100 ml. respectively, but facilitate an assessment to within 5–10 mg. up to about 400 mg. per 100 ml. Appropriate blood specimens are incubated together with standards covering the expected range and using the highest indicator that will produce a stain. All stains are permanent for at least twenty minutes.

* Now at Research Division, Glaxo Laboratories, Greenford, Middlesex.



Reagents and Materials

Blood-collecting pipettes.—Glass tubing is drawn out, so as to be capable of delivering 10–20 µl. blood from a 2-3 cm. length. Melting-point tubes or micro-Ostwald pipettes may be used. With the aid of a drop of mercury a number of similar pipettes are marked to deliver the same volume.

Anticoagulant.—Aqueous sodium citrate (3·8% w/v).

Urease preparation.—About 0·5 g. of soybean meal (British Drug Houses) is used. This may be dispensed from a calibrated tube into 'Bijou' bottles and stored until required. The crude urease is shaken with 5 ml. dilute alkali (approximately *N*/50 sodium hydroxide is suggested). The suspension must have a pH within the range 7·0–7·5 and should be used within four hours of the time of preparation.

Tube rack.—The rack ensures that the bottom of every tube is equally heated. A piece of any convenient material of about $^3/_8$ in. thickness and of a length to fit an existing oven should have a number of holes bored out and countersunk, so that when the tubes are fitted through it their rims project about $^1/_{32}$ in. above the surface. The holes should be spaced out with at least $^3/_4$ in. between adjacent edges and a lid constructed with holes concentric with, but of a diameter $^1/_4$ in. larger than, those of the rack. The top is hinged for convenience and provided with a means of clamping securely.

Filterpaper.—Whatman no. 3 MM (specially selected for chromatography purposes) is recommended.

Indicator pipette.—A fine-bore pasteur pipette producing a relatively constant size of drop should be used.

Indicators.—These are modifications of Feigl's (1933) reagent. 6·7 g. silver nitrate and 18·4 ml. 50% w/v manganese-nitrate solution (B.D.H.) are dissolved in about 160 ml. distilled water. Normal sodium hydroxide is added until a dark-grey precipitate persists for thirty seconds after vigorous shaking (approximately 0·6 ml. is required). The solution is filtered and made up to 200 ml. A second batch of the reagent is similarly prepared but incorporating 16 ml. 2*N* nitric acid before making up to volume. Indicators are now prepared from these two stock solutions. We have found the mixtures shown in table I satisfactory, but they can be varied to suit individual requirements. A more acid indicator than D may occasionally be useful.

TABLE I—INDICATORS USED

Indicator	Lowest limit of detection (mg. urea per 100 ml.)	Feigl's reagent (ml.)	Acidified reagent (ml.)
A	15	9·6	0·4
B	40	8·8	1·2
C	100	5·0	5·0
D	200	..	10·0

Stock solutions and indicators should be protected from direct sunlight. If stored in a refrigerator when not in use they will keep for several months.

Hot-air oven.—The oven routinely used for drying electrophoresis papers may be kept constantly at 110°C and regulated to 120°C five minutes before it is required.

Results

Routine requests for blood-urea estimations provided 415 consecutive samples for microanalysis. Estimations on the same blood-sample by the method of Archer and Robb (1925) were also performed by four student technicians under supervision for different periods during this investigation.

Feigl's reagent, employed for the first 200 tests, gave results recordable in units of 10 mg. per 100 ml. only. Results on later specimens with improved indicators are shown in table II. Since it was usually possible to estimate to the nearest 5 mg. per 100 ml. this unit is used here for comparison. 201 out of 213 (94%) tests carried out by the

TABLE II—COMPARISON OF BLOOD-UREA VALUES OBTAINED (MG. UREA PER 100 ML.) BY THE METHOD OF ARCHER AND ROBB AND BY OUR MICROMETHOD IN 213 SPECIMENS

Micro method	Archer and Robb method			Micro method	Archer and Robb method		
	Mean	Range	Number of analyses		Mean	Range	Number of analyses
15–20	19	(13–33)	28	135	144	(141–147)	3
25–30	27	(17–40)	51	140	139	..	1
35–40	36	(23–47)	39	145	146	..	1
45	41	(31–47)	7	150	149	(131–168)	3
50	48	(40–55)	9	160	161	(156, 166)	2
55	54	(42–63)	6	170	149	..	1
60	61	(52–75)	15	175	170	..	1
65	65	(56–72)	6	180	186	..	1
70	68	(61–77)	4	190	187	..	1
75	72	(63–86)	4	200	200	..	1
80	84	(79–92)	3	210	205	..	1
85	84	(74–101)	5	250	250	..	1
90	85	(80, 90)	2	300	320	..	1
100	102	(81–122)	4	320	308	..	1
105	111	(101, 122)	2	370	383	..	1
110	117	..	1	390	350	..	1
115	111	..	1	500	505	..	1
120	110	..	1	600	650	..	1
125	122	..	1	700	630	..	1
Total	..	..	189	Total	..	..	24

method of Archer and Robb came within 10% of the microestimate.

Recovery experiments were performed on whole blood collected from a patient who was bled therapeutically for hæmochromatosis. Quantities of urea from 20 to 410 mg. per 100 ml. were added to samples of his blood. The mean recovery of 23 experiments was 96%.

Urea levels obtained by rapid repeated estimations under emergency conditions on individual samples of oxalated blood are given in table III.

A neutral solution containing 30 mg. per 1000 ml. of each of the aminoacids normally present in blood was prepared. Its addition to blood samples did not alter significantly the results. The presence of ' Sulphatriad ' (100 mg. per 100 ml.), sodium barbitone (100 mg. per 100 ml.), sodium salicylate (50 mg. per 100 ml.) or paraldehyde at therapeutic blood-levels did not interfere with the test. The estimation is uninfluenced by gross hæmolysis.

TABLE III—REPLICATE ANALYSES (MG. UREA PER 100 ML.) ON FOUR BLOOD SAMPLES

No. of estimations	Mean value	Standard deviation	V
12	30·7*	2·5	8·3
25	60·0	5·0	8·2
20	143·0	12·3	8·6
21	270·2	23·1	8·5

* Archer and Robb values: 32, 29, and 32 mg. per 100 ml.

Discussion

Our original object was to devise a rapid method of blood-urea estimation for a medical emergency; but the technique, as finally developed, will give almost as reliable results as the conventional method.

The simplicity of our technique allows little to go wrong. Since the final assessment is made on both the size and the intensity of a black stain, it is less subject to personal variations than when coloured papers are matched. Slight differences in quality of different batches of Whatman no. 3 MM paper affect their ability to produce stains. This does not detract from the reliability of the estimations, although it precludes satisfactory use of artificial standards.

Incubation of the blood/urease mixtures at room temperature for longer than one minute before heating has produced no discernible increase in the density of the stain. No ammonia has been detected as a result of heating either blood or urease-suspension alone for nine minutes at 130°C. Below 100°C incubation of urea solutions with urease produces no stain. When the blood/urease mixtures are incubated at temperatures above 130°C, or for more than ten minutes at 120°C non-urea substances may form a deposit; under these conditions glutamine in ten times its average normal concentration in the blood will produce ammonia; and sulphur-containing aminoacids may produce hydrogen sulphide. Both would interfere with the test. According to Addis (1928) aminoacids in soybean and jack-bean meals can react with blood enzymes to produce ammonia in much larger quantities than those derived from urea, but we have no evidence of this under our conditions.

In 7 of 415 tests results of the two methods differed by more than 10% of their mean. 2 were postmortem bloods with values considerably lower by the micro method than by the Archer and Robb method. We were unable to demonstrate the presence of an enzyme inhibitor, or a conjugated form of urea in these samples. Although addition of 200 mg. lactic acid per 100 ml. blood decreases (by our method) the apparent urea content by 30 mg. per 100 ml., we could not establish the cause of the discrepancy in these cases. These results have been excluded from the table. Repeat estimations of the other 5 blood-ureas showed the original Archer and Robb results to have been incorrect. Our method does, however, appear to be unreliable on samples obtained post mortem.

Though it may be claimed that the blood-urea level is only of limited clinical significance, urea estimations are among the commonest investigations performed in hospital laboratories. In this hospital about 20 are performed each day in two (occasionally three) batches. The total cost of this is about 15*s.* a day. The maximum cost of the same work by our method (in reagents and technicians' time) is 3*s.* 9*d.*

Urine-urea is frequently determined by gasometric methods which are not very accurate. The present method has been applied satisfactorily to the estimation of urea in a drop of urine previously diluted 1/20 and neutralised.

Summary

A new quick method for the determination of urea is described. This is a simple spot test suitable for use with as little as one drop of capillary blood, urine, or other body fluid.

The method makes use of a soybean meal suspension, a filterpaper treated with manganese and silver nitrate, and a hot-air oven.

There is good correlation between the values obtained by this procedure and that of Archer and Robb. Estimations on blood to which varying amounts of urea have been added show a satisfactory recovery.

The cost of the procedure in reagents and technicians' time is about a quarter of that of conventional methods.

We thank Mr. K. G. Rodgers, A.I.S.T., for his cooperation in the design and construction of the tube-holder, and Miss I. N. Burditt for her clerical assistance.

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TOTAL EXCHANGEABLE SODIUM AND POTASSIUM IN NON-PREGNANT WOMEN AND IN NORMAL AND PRE-ECLAMPTIC PREGNANCY

I. MACGILLIVRAY
M.D. Glasg., M.R.C.O.G.
SENIOR LECTURER IN MIDWIFERY

T. J. BUCHANAN
M.A. Glasg., Ph.D. Lond.
SENIOR LECTURER IN NATURAL PHILOSOPHY

UNIVERSITY OF ABERDEEN

IN many obstetric units the intake of sodium salts is restricted in the treatment of pre-eclampsia because of the belief that the œdema in this condition is associated with excessive retention of sodium. Furthermore, some go so far as to say that excessive sodium retention is an important ætiological factor in the causation of pre-eclampsia.

There is general agreement that the body contains more sodium in pregnancy than in the non-pregnant state, although the amount of the excess is in doubt. The published data on the amounts of sodium retained in pre-eclampsia show wide disagreement, possibly because the traditional methods of estimating the sodium content of the body are laborious and inaccurate. Potassium also appears to be increased in pregnancy, but again the effect of pre-eclampsia on this is uncertain. We describe here the results of a study of sodium and potassium in normal and pre-eclamptic pregnancy using the isotope-dilution technique.

Material

Four groups of primigravidæ were studied—8 with normal pregnancies in the first trimester, 16 with normal pregnancies in the last trimester, 16 with mild pre-eclampsia, and 16 with severe pre-eclampsia. In addition values were obtained in 24 non-pregnant women of age-range 16-37 years (average 27·2 years). Care was taken to differentiate between pre-eclampsia and pre-existing renal disease or essential hypertension. Mild pre-eclampsia is defined as a rise in diastolic pressure to 90 mm. Hg or more after the 26th week of pregnancy on at least two occasions separated by a day. In severe pre-eclampsia there is, in addition, albuminuria amounting to 0·25 g. per litre or more. During the investigation the patients received no treatment beyond rest in bed. The procedure was explained to the patients, and their consent was obtained. A single dose only was given to each patient.

Methods

The method of sodium and potassium estimation was essentially that of Robinson et al. (1955). Approximately 50 μc ^{24}NaCl and 50 μc ^{42}KCl, obtained from the Atomic Energy Research Establishment at Harwell, were injected into the antecubital vein after the patient had emptied her bladder. To ensure that the total dose was injected into the vein the following technique was adopted:

As much as possible of the radioactive solution was withdrawn from the container which was then half-filled with physiological saline solution and shaken. The saline was then drawn up into the same syringe with the radioactive solution, and, using the same needle, the contents were injected into the antecubital vein. The plunger was then withdrawn and the syringe was filled with blood, which was reinjected. The reliability of this method was tested by counting the containers and syringes for radioactivity. It was found that a negligible fraction of the dose remained in the syringe and container.

All urine passed in the next twenty-four hours was collected and also the hourly output of urine in the twenty-fifth and twenty-sixth hours. The radioactivity of the samples and of standard solutions of ^{42}K and ^{24}Na were counted in a well-type scintillation counter and in a Geiger-Müller counter. James et al. (1954) found that the precision of the combined $Na^e K^e$ determinations compared very favourably with that of the single isotope method. The content of stable sodium and potassium in the urine specimens was estimated in an Evans electro-selenium flame photometer. The total exchangeable sodium (Na^e) and potassium (K^e) were then calculated from the formula:

$$\frac{\text{(Activity injected)-(activity excreted)}}{\text{activity in urine sample}} \times \text{electrolyte in urine sample}$$

The results were related to the height, weight, and surface-area of the women.

Results

The detailed results for the four groups—normal early pregnancy, normal late pregnancy, mild pre-eclampsia, and severe pre-eclampsia are shown in tables I–IV. These results are summarised in table V.

In the normal non-pregnant women the mean values were 41·5 mEq. Na^e per kg. (range 31·1–50·0) and 43·6 mEq. K^e per kg. (range 35·7–53·7). Their average weight was 55·1 kg. (range 38·2–73·0 kg.). The average total exchangeable sodium was 2265 mEq. (range 1645–2870 mEq.) and the average total exchangeable potassium was 2370 (range 1770–3025 mEq.). These values for sodium in the non-pregnant women agree with those of other workers. The average values found by Forbes and Perley (1951), Miller and Wilson (1953), Moore et al. (1954), Arons et al. (1954), and Klein and Carey (1957) were 39·5 mEq. per kg., 42·3 mEq. per kg., 39·6 mEq. per kg., 39·7 mEq. per kg., and 39·2 mEq. per kg. respectively.

The average value for total exchangeable potassium in non-pregnant women was found to be higher than that reported by Aikawa et al. (1952) (31·5 mEq. per kg.) and by Blainey et al. (1954) (35·0 mEq. per kg.), but was in closer agreement with that found by Moore et al. (1954) (42·4 mEq. per kg.) and by Sagild (1956) (40·0 mEq. per kg.).

The age, weight, height, and surface-area (determined by Du Bois formula) were tried as independent variables used to help the prediction of Na^e and K^e values; weight was clearly the best single variable for this purpose; none of the other factors added significantly to the "explained" variance once weight had been taken into account. Surface-area is almost as good, but it is estimated by a formula which gives only approximations and is not

TABLE I—NORMAL EARLY PREGNANCY (PRIMIGRAVIDÆ)

No.	Age (yr.)	Duration of pregnancy (weeks)	Body-weight (kg.)	Height (cm.)	Surface-area (sq. m.)	Na^e				Na^e/K^e ratio	K^e			
						mEq.	mEq. per kg.	mEq. per cm.	mEq. per sq. m.		mEq.	mEq. per kg.	mEq. per cm.	mEq. per sq. m.
1	32	8	46·4	156	1·43	2230	48·1	14·3	1560	1·24	1795	38·7	11·5	1255
2	22	13	43·9	153	1·37	2160	49·2	14·1	1580	1·16	1860	42·4	12·2	1355
3	22	11	40·2	154	1·33	2035	50·6	13·2	1525	1·39	1465	36·4	9·5	1105
4	19	13	59·0	159	1·59	2268	38·4	14·3	1430	1·00	2260	38·3	14·2	1425
5	24	10	48·7	152	1·43	2108	43·3	13·8	1475	1·07	1970	40·5	12·9	1380
6	17	12	49·8	141	1·37	2195	44·1	15·5	1602	0·98	2250	45·2	15·9	1642
7	21	12	47·6	151	1·46	2335	49·1	14·5	1600	1·18	1978	41·6	12·3	1355
8	27	11	56·5	160	1·57	2655	47·0	16·6	1691	1·17	2275	40·3	14·2	1449
Average	23	11·2	49·0	154·5	1·44	2248	46·2	14·5	1558	1·15	1982	40·4	12·8	1371

TABLE II—NORMAL LATE PREGNANCY (PRIMIGRAVIDÆ)

No.	Age (yr.)	Duration of pregnancy (weeks)	Body-weight (kg.)	Height (cm.)	Surface-area (sq. m.)	Na^e				Na^e/K^e ratio	K^e			
						mEq.	mEq. per kg.	mEq. per cm.	mEq. per sq. m.		mEq.	mEq. per kg.	mEq. per cm.	mEq. per sq. m.
1	42	36	59	151	1·54	3070	52·0	20·3	1990	1·199	2560	43·4	16·9	1660
2	25	34	72·1	160	1·76	3320	46·0	20·7	1890	1·181	2810	39·0	17·6	1600
3	26	36	63·6	153	1·60	3115	49·0	20·4	1950	1·400	2225	35·0	14·5	1390
4	23	40	68·4	153	1·66	2950	43·1	19·3	1775	1·039	2840	41·5	18·5	1710
5	25	39	65·9	145	1·56	2700	41·0	18·6	1740	1·125	2400	36·4	16·6	1540
6	23	34	48·8	153	1·44	2490	51·0	16·3	1725	1·186	2100	43·0	13·7	1460
7	18	38	53·6	158	1·53	2360	44·0	14·9	1550	1·113	2120	39·6	13·4	1390
8	26	30	63·9	155	1·62	2890	45·2	18·6	1780	1·209	2390	37·4	15·4	1475
9	20	36	66·0	156	1·66	3415	51·7	21·9	2000	1·377	2480	37·6	16·0	1500
10	38	39	55·0	148	1·47	2855	51·9	19·3	1950	1·182	2415	43·9	16·3	1640
11	20	37	62·2	156	1·62	2870	46·1	18·4	1770	1·081	2655	42·7	17·0	1640
12	28	40	75·3	156	1·76	3623	48·1	23·2	2060	1·228	2950	39·2	18·9	1680
13	38	40	73·7	165	1·81	3460	46·9	21·0	1910	1·306	2650	36·0	16·1	1465
14	28	36	67·0	151	1·62	3515	52·5	23·2	2170	1·217	2888	43·1	19·1	1785
15	23	39	57·2	154	1·54	2720	47·6	17·6	1765	1·165	2335	40·8	15·1	1510
16	20	40	53·2	149	1·46	2990	56·2	20·0	2050	1·053	2840	53·4	19·0	1940
Average	26·4	37·3	62·8	153·9	1·60	3021	48·3	19·6	1879	1·191	2541	40·8	16·5	1586

applicable to pregnant women. The results obtained have accordingly been related to weight and expressed as mEq. per kg.

Sodium

There is no significant difference (see table v) in total exchangeable sodium between the non-pregnant and early-pregnancy values, nor between the normal late pregnancy and mild and severe pre-eclampsia values. In late pregnancy, whether normal or pre-eclamptic, the amount of sodium is significantly increased, compared with non-pregnant and early pregnancy.

The average amount of sodium in normal late pregnancy in excess of that in the non-pregnant women is 756 mEq.—an amount which agrees remarkably with what might be expected on theoretical grounds (table vi).

The average amounts of sodium in mEq. per kg. in non-pregnant, normal early pregnancy, normal late pregnancy, and mild and severe pre-eclampsia are 41·5, 46·2, 48·3, 44·0, and 43·8 respectively. There is therefore considerable retention of sodium in normal pregnancy, especially in the later months. The decrease of body-sodium per kilogramme in pre-eclampsia compared with late normotensive pregnancy is statistically significant ($P < 0.02$).

TABLE III—MILD PRE-ECLAMPSIA (PRIMIGRAVIDÆ)

No.	Age (yr.)	Duration of pregnancy (weeks)	Body-weight (kg.)	Height (cm.)	Surface-area (sq. m.)	Na^e				Na^e/K^e ratio	K^e			
						mEq.	mEq. per kg.	mEq. per cm.	mEq. per sq. m.		mEq.	mEq. per kg.	mEq. per cm.	mEq. per sq. m.
1	23	32	66·0	153	1·64	2905	44·0	19·0	1770	1·088	2670	40·5	17·4	1630
2	20	38	75·7	160	1·80	3330	44·0	20·8	1850	1·148	2900	38·3	18·1	1610
3	26	32	60·8	153	1·58	2920	48·0	19·1	1845	1·132	2580	42·4	16·9	1635
4	21	40	54·0	153	1·49	2860	53·0	18·7	1920	1·362	2100	38·9	13·7	1410
5	30	40	75·6	166	1·84	3210	42·5	19·4	1745	1·249	2570	34·0	15·5	1405
6	24	36	66·8	156	1·67	3205	48·0	20·5	1825	1·264	2535	37·9	16·2	1510
7	20	36	61·6	148	1·55	3245	52·7	21·9	2150	1·408	2305	37·4	15·6	1490
8	26	30	62·7	155	1·60	2920	46·6	18·8	1825	1·482	1970	31·4	12·7	1230
9	25	38	89·6	166	1·99	3730	41·6	22·4	1875	1·157	3222	36·0	19·4	1620
10	25	36	87·3	161	1·92	3600	41·2	22·3	1870	1·176	3060	35·1	19·0	1595
11	20	37	72·2	146	1·65	2775	38·4	19·0	1850	1·263	2197	30·4	15·0	1330
12	19	41	80·0	156	1·81	3335	41·7	21·4	1840	1·249	2670	33·4	17·1	1480
13	36	33	58·7	144	1·49	2600	44·3	18·0	1750	1·300	2000	34·1	13·9	1340
14	20	33	77·6	161	1·82	3025	39·0	18·8	1670	1·007	3005	38·7	18·7	1655
15	25	38	63·5	156	1·63	2735	43·1	17·5	1675	1·137	2405	37·9	15·4	1350
16	25	38	90·0	169	2·01	3265	36·3	19·3	1625	0·946	3450	38·3	20·4	1715
Average	24·1	36·1	71·4	156·4	1·69	3104	44·0	19·8	1755	1·210	2602	36·5	16·5	1500

Table v shows that, although there was no significant difference between the total sodium in the non-pregnant and early-pregnancy cases, the amount of sodium per kg. is raised in the latter group. This can be explained by the fact that the non-pregnant patients were heavier than those in the early-pregnancy group (55·1 kg., compared with 49·0 kg.). This does not, of course, imply that there is a

TABLE IV—SEVERE PRE-ECLAMPSIA (PRIMIGRAVIDÆ)

No.	Age (yr.)	Duration of pregnancy (weeks)	Body-weight (kg.)	Height (cm.)	Surface-area (sq. m.)	Na^e				Na^e/K^e ratio	K^e			
						mEq.	mEq. per kg.	mEq. per cm.	mEq. per sq. m.		mEq.	mEq. per kg.	mEq. per cm.	mEq. per sq. m.
1	26	37	82·2	157	1·83	3700	45·0	23·6	2020	1·407	2630	32·0	16·7	1440
2	23	34	71·3	153	1·69	3210	45·0	21·0	1900	1·269	2530	35·5	16·5	1500
3	23	32	62·3	149	1·56	2960	47·5	19·8	1900	1·213	2440	39·2	16·4	1440
4	23	35	81·7	151	1·79	3760	46·0	24·9	2100	1·441	2610	31·9	17·3	1460
5	35	30	80·2	164	1·87	3640	45·4	22·2	1940	1·361	2675	33·4	16·3	1435
6	21	38	70·2	154	1·68	2790	39·7	18·1	1660	1·143	2440	34·8	15·9	1450
7	36	40	58·3	144	1·48	2687	46·1	18·7	1810	1·340	2005	34·4	14·0	1360
8	25	37	78·9	164	1·85	3385	42·9	20·6	1830	1·230	2752	34·9	16·8	1480
9	23	32	66·8	157	1·67	2656	39·8	17·0	1600	1·207	2200	32·9	14·0	1320
10	20	36	62·8	139	1·49	2710	43·2	19·5	1820	1·213	2235	35·6	16·0	1495
11	25	37	77·0	173	1·91	3510	45·6	20·3	1840	1·256	2795	36·3	16·2	1460
12	19	36	80·0	160	1·84	3480	43·5	21·7	1890	1·259	2765	34·6	17·3	1510
13	21	24	71·7	165	1·79	3188	44·5	19·3	1785	1·355	2352	32·8	14·2	1315
14	23	38	70·0	157	1·71	3000	42·9	19·1	1760	1·099	2730	39·0	17·4	1595
15	24	33	61·0	149	1·55	2425	39·8	16·3	1570	1·083	2240	36·7	15·0	1440
16	23	38	66·3	154	1·64	2920	44·0	19·0	1780	1·159	2520	38·0	16·4	1536
Average	24·4	34·6	71·3	155·6	1·71	3126	43·8	20·1	1825	1·252	2495	35·1	16·1	1452

TABLE V—AVERAGE VALUES OF EXCHANGEABLE SODIUM (Na^e) AND POTASSIUM (K^e)

—	Na^e	S.D.	Na^e per kg.	S.D.	K^e	S.D.	K^e per kg.	S.D.	Na^e/K^e	S.D.
Non-pregnant	2265	293	41·5	4·2	2370	348	43·6	5·3	0·95	0·16
Normal early pregnancy ..	2248	188	46·2	4·1	1982	281	40·4	2·6	1·15	0·12
Normal late pregnancy ..	3021	369	48·3	3·7	2541	276	40·8	3·2	1·19	0·10
Mild pre-eclampsia	3104	313	44·0	4·5	2602	438	36·5	3·3	1·21	0·14
Severe pre-eclampsia	3126	418	43·8	2·3	2495	236	35·1	2·3	1·25	0·10

fall in weight at the beginning of pregnancy. Correcting for weight, taking the average of 57·7 kg. for the non-pregnant, early-pregnancy, and normal late-pregnancy groups, the values found were 2339, 2593, and 2877 mEq. respectively. The difference between the three groups is statistically significant ($P = 0·005$). There was no significant difference between mild and severe pre-eclampsia in either the total sodium content or the amount of sodium per kilogramme of body-weight.

Potassium

The average values for total exchangeable potassium in the non-pregnant, normal early-pregnancy, normal late-pregnancy, and mild and severe pre-eclampsia groups were 2370, 1982, 2541, 2602, and 2495 mEq. respectively (table V). There is a fall in the total amount of potassium in early pregnancy compared with the non-pregnant, but this is again due to the greater weight of the non-pregnant women. There was a greater amount of potassium in late pregnancy compared with early pregnancy, but there was no significant difference between the values in normal late pregnancy and mild or severe pre-eclampsia.

When the results are related to weight the average potassium values are 43·6, 40·4, 40·8, 36·5, and 35·1 mEq. in the non-pregnant, early-pregnancy, normal late-pregnancy, and mild and severe pre-eclampsia groups respectively. There is thus a decrease in the amount of potassium per kilogramme in pregnancy compared with the non-pregnant value.

The difference between the two pre-eclampsia groups is slight, and not statistically significant. As with sodium the difference between the normal late-pregnancy and pre-eclamptic groups is statistically significant ($P < 0·001$).

Sodium : Potassium Ratio

There is a slight increase in the Na : K ratio in pregnancy (table V) which indicates a relatively greater retention of sodium, but the difference between normal late pregnancy and pre-eclampsia is insignificant.

Equilibration-time

As the decreased values for sodium and potassium in pre-eclampsia might have been due to delay in diffusion of the radioactive isotopes into œdema fluid or tissues, the time taken to reach equilibrium was estimated by making serial counts for sodium in 1 normal and 3 pre-eclamptic pregnancies. Similar observations were made for potassium in 5 normal and 4 pre-eclamptic pregnancies. No difference was found in the equilibration-time for either sodium or potassium between the normals and pre-eclamptics. The equilibration-time for sodium was six hours and for potassium twenty-two hours.

Discussion

There have been many studies of sodium and potassium in pregnancy and pre-eclampsia; but there are only two reported series in which the isotope-dilution technique has been employed to estimate sodium, and no estimations of total exchangeable potassium have been reported previously.

Dieckmann and Pottinger (1957), using radioactive sodium (^{22}Na), found in an unspecified number of women the average sodium content in normal pregnancy to be 2772 mEq. antepartum and 2505 mEq. post partum. They concluded from these results that a slight retention of sodium occurs in pregnancy. The antepartum value was 40·2 mEq. per kg. body-weight compared with 42·3 mEq. kg. post partum. This would seem to indicate that in pregnancy there is relatively less sodium than in the non-pregnant. Theoretical considerations (see table VI) and other published work suggest that this is unlikely. In pre-eclampsia they found an average value of 44·9 mEq. per kg. compared with 40·2 mEq. per kg. in normal pregnancy.

Gray and Plentl (1954) estimated the total exchangeable sodium at intervals during pregnancy in 10 women. 1 of these developed vomiting in late pregnancy and another mild pre-eclampsia. In the 8 presumably normal cases the average amount of sodium in early pregnancy was 2289 mEq. compared with 2816 mEq. in late pregnancy, giving a sodium retention of 527 mEq. The total exchangeable sodium was increased in the patient with pre-eclampsia.

The present findings confirm that there is storage of sodium in normal pregnancy. Moreover the amount which is stored is equal to that required to retain the extra water which accumulates in pregnancy (table VI).

TABLE VI—CALCULATED SODIUM STORAGE IN NORMAL PREGNANCY

Site	Amount of fluid (litres)	Na level (mEq.)	Total Na (mEq.)
*Mother:**			
Intravascular	1·2	140	168
Extravascular	2·2	140	308
Infant:			
Weighing 7 lb. and with sodium space of 43%†	1·4	120	168
Placenta:			
Assuming all extracellular fluid to be fœtal blood	0·1	120	12
Liquor Amnii:			
Average volume 788 ml.‡	0·79	125	99
			755

* Leitch (1957). † Fellers et al. (1949). ‡ Hutchison et al. (1955).

In normal pregnancy, therefore, there is proportionate retention of sodium and water.

There is also retention of sodium in pre-eclampsia, but this is not significantly greater than in normal pregnancy. Indeed, if allowance is made for the excessive weight increase in pre-eclamptics, it is clear that these patients retain less sodium per kg. than those in whom pregnancy is normal, probably because much of the excessive weight in pre-eclampsia is due to water retention. There is then no excessive storage of sodium in pre-eclampsia, and water is stored without sodium.

Retention of potassium was found in normal pregnancy in the present investigation, but it is less proportionately than might be expected when the patients' increase in weight is taken into account. In this way it is unlike sodium, where the retention was proportionately more than the increase in body-weight. This can be accounted for by the relatively greater increase in extracellular fluid than lean tissue in pregnancy, sodium being mainly extracellular and potassium intracellular.

In pre-eclampsia the amount of total exchangeable potassium is approximately the same as in normal late pregnancy; but the amount per kg. body-weight is less, presumably owing to the greater retention of water in pre-eclampsia.

The sodium : potassium ratio in pre-eclampsia is approximately the same as in normal pregnancy, indicating that equal " dilution " of sodium and potassium occurs in pre-eclampsia. The fall in both sodium and potassium in pre-eclampsia compared to normal late pregnancy was approximately 4 mEq. per kg.

It may thus be concluded that sodium retention is not the cause of œdema in pre-eclampsia, and that the retention of water is out of proportion to that of salt. Some of the excessive weight-gain in pre-eclampsia may be due to deposition of fat and/or lean tissue, but the major part of it is probably due to water retention. The phenomenon is similar to the water retention caused by pituitary antidiuretic substance. The absence of any quantitative difference in sodium in mild and severe pre-eclampsia also suggests that these electrolytes do not play an important part in the production of pre-eclampsia.

Restriction of the sodium content of the diet is commonly advocated in the treatment of pre-eclampsia, and it does appear to be helpful clinically in decreasing water retention. It does not follow that the primary cause of pre-eclampsia is sodium retention. Robinson's (1958) claim that increased intake of salt during pregnancy will prevent or cure pre-eclampsia is difficult to reconcile with the present findings.

Summary

Total exchangeable sodium and potassium were estimated simultaneously with ^{24}Na and ^{42}K in 16 primigravidæ in normal late pregnancy, 16 with mild pre-eclampsia, and 16 with severe pre-eclampsia. The results were related to the weight of the patients and compared with values obtained in 24 non-pregnant women and 8 in the early months of pregnancy.

The total exchangeable-sodium content was found to be greater in normal pregnancy and in pre-eclampsia than in the non-pregnant. No significant difference was found between the amounts in normal pregnancy and pre-eclampsia, nor between mild and severe pre-eclampsia.

The amount of sodium per kg. body-weight was greater in the early months of normal pregnancy than in the non-pregnant. It was even greater in normal late pregnancy, but in pre-eclamptic patients there was less sodium per kg. than in normal pregnant women.

There is a slight increase in the total exchangeable potassium in pregnancy both normal and pre-eclamptic, but the amount per kg. is decreased in both. The pre-eclamptic patients have less potassium per kg. than the normotensive patients.

It is concluded that the amount of sodium retained in pre-eclampsia is the same as in normal pregnancy, but there is a greater retention of water in pre-eclampsia than in normal pregnancy. Sodium retention is, therefore, not the cause of œdema in pre-eclampsia.

No difference was found in the equilibration-time for either sodium or potassium in the normal as compared to pre-eclamptic patients.

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INHIBITORY ACTION OF HALOTHANE ON CONTRACTILITY OF HUMAN PREGNANT UTERUS

MOSTYN P. EMBREY
M.D. Wales, F.R.C.S.E., M.R.C.O.G.
FIRST ASSISTANT, NUFFIELD DEPARTMENT OF OBSTETRICS AND GYNÆCOLOGY, UNIVERSITY OF OXFORD

WILLIAM J. GARRETT
M.B. Sydney, F.R.C.S.E., M.R.C.O.G.
ASSISTANT IN THE DEPARTMENT

DEREK L. PRYER
M.B. Lond., F.F.A. R.C.S.
RESEARCH ASSISTANT,
NUFFIELD DEPARTMENT OF ANÆSTHETICS,
UNIVERSITY OF OXFORD

WE were recently impressed, when performing external version, to note on palpation the degree of relaxation of the uterus apparently afforded by halothane (' Fluothane ') anæsthesia. We report here an investigation of the effect of halothane anæsthesia on uterine contractility by tocographic means.

Method

Studies were undertaken in 12 patients. In 10 cases (9 for surgical induction of labour, 1 for external version) records were obtained of the painless contractions of the uterus in late pregnancy. In the remaining 2 cases (1 for cæsarean section, 1 for forceps delivery) the records were obtained during labour. The difference between the uterine contractions of late pregnancy and those of labour is one of degree only; both can be appreciated by the palpating hand and recorded objectively. (In the second stage of labour the contractility record exhibits, too, the superimposed expulsive efforts of the mother.)

All the records of uterine contractility were obtained by means of the external tocograph described by one of us (Embrey 1955). External tocography provides a convenient means of recording uterine contractility in that it entails placing only a small receptor unit over the uterus, the contractions of which are transmitted to a recording unit at the bedside. It is in effect a useful alternative to the classical internal methods of recording intrauterine pressure, is more acceptable to the patient, and provides records which are sufficiently accurate for most purposes.

In each case the pattern of uterine contractility was studied for a control period both before and after the induction of anæsthesia.

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DATA ON 12 CASES IN WHICH HALOTHANE WAS ADMINISTERED

Case no.	Indication	Premedication atropine (gr.)	Halothane (%)	Duration of anæsthesia (min.)	Recovery of consciousness (min.)
1	Surg. induction	1/75	2–3	13	11
2	,, ,,	1/100	2	16	13
3	,, ,,	1/75	2	24	10
4	,, ,,	1/100	2	27	9
5	,, ,,	1/75	2	22	9
6	Ext. version	1/75	2–3	25	10
7	Surg. induction	1/100	2	26	9
8	,, ,,	1/75	2–2·5	35	11
9	,, ,,	1/75	2	15	8
10	,, ,,	1/75	2	15	6
11	Forceps	1/75	2–3	35	10
12	Cæsarean section	1/100	2	47	8

Premedication was with atropine in a dose of gr. 1/100 or gr. 1/75 (see accompanying table). Induction and maintenance were carried out with halothane and air enriched with oxygen, using the modified E.M.O. Vaporiser (Epstein 1957) and the Oxford Inflating Bellows (Macintosh 1953). The duration of anæsthesia varied between 13 and 35 minutes, and at no time was a concentration of more than 3% halothane required. Most patients were maintained on 2%.

Results

In each of the 12 cases halothane was found to have a definite inhibitory effect on the contractility of the uterus with complete or almost complete obliteration of the contractions (fig. 1). Graphically—as would be expected—the action was most pronounced when the pre-anæsthetic activity of the uterus was greatest, but in all instances the effect was obvious.

Inhibition of spontaneous uterine contractility was demonstrated in 11 of the cases. In the remaining case (fig. 2) an oxytocin intravenous infusion was being used and an exactly similar effect on the artificially induced

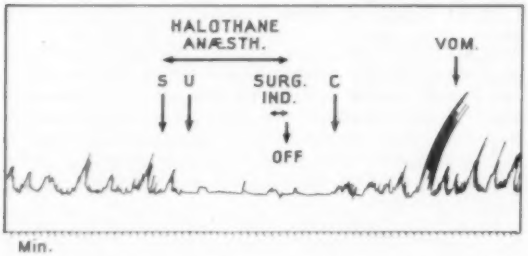

Fig. 1—Case 9: inhibition of spontaneous uterine contractility by halothane.
S = start. U = unconscious. C = conscious. Vom = vomiting.

contractions was observed. In all patients the inhibitory effect occurred rapidly after loss of consciousness and disappeared just as quickly when the anæsthetic was withdrawn.

Comments

In this small series induction of anæsthesia was easy, rapid, pleasant, and very rarely attended by excitement. In every case consciousness was recovered within a few minutes.

It has been reported that severe falls of pulse-rate may accompany halothane anæsthesia (Bryce Smith and O'Brien 1956). In our series, using atropine alone as premedication, the slowest pulse-rate recorded at any time was 72.

Oxygen was admitted to the stopcock of the Oxford inflating bellows to compensate for any respiratory depression, which sometimes accompanies the use of halothane. No patient became cyanosed. 1 patient vomited once shortly after consciousness had been regained.

Particularly striking was the rapidity with which uterine contractility was inhibited. Moreover, the inhibitory effect was evident at a fairly light plane of anæsthesia, as all patients showed stimulation of breathing, and some stridor as well, when the cervix was stretched. Again the pre-anæsthetic uterine contractility pattern was quickly re-established when consciousness returned.

In indicating the clear inhibitory effect of halothane on the contractility of the parturient uterus, we do not intend to recommend its widespread use in obstetrics. But an anæsthetic agent which relaxes the uterus so effectively,

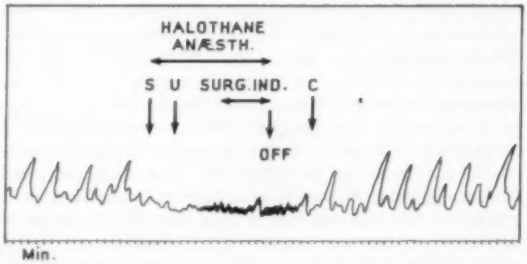

Fig. 2—Case 10: inhibition of oxytocin-induced contractions by halothane. Abbreviations as in fig. 1.

and which may not, perhaps, have the dangers of chloroform or the unpleasant sequelæ of deep ether, may find a place in circumstances where uterine relaxation is essential. Its value might be considerable, for example, in the performance of version or other intrauterine manipulation, in cases of constriction ring, or when an overdose of oxytocin or impending tonic contraction threatens uterine rupture. Conversely, this drug may be found to be contraindicated in circumstances where uterine relaxation is a disadvantage: severe uterine hæmorrhage may attend the use of halothane in vaginal delivery and cæsarean section (Albert 1958, Kay 1958, Mackay 1957, Russell 1958). Our own experience of halothane for cæsarean section is limited to 4 cases; and in these the bleeding gave no cause for alarm.

Summary

Tocographic records demonstrating the effect of halothane anæsthesia on the contractility of the human pregnant uterus have been obtained in 12 cases.

In each case uterine contractility was clearly inhibited, with obliteration of both spontaneous and oxytocin-induced contractions.

The inhibitory effect was rapidly produced at a relatively light plane of anæsthesia and quickly disappeared when consciousness was recovered.

We are indebted to Sir Robert Macintosh and Prof. J. C. Moir for helpful criticism in the preparation of this paper.

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SPONTANEOUS STRANGULATION IN DIAPHRAGMATIC HERNIA

R. L. SHAH
M.S. Bombay, F.R.C.S.E.
THORACIC SURGICAL REGISTRAR, CITY GENERAL HOSPITAL, SHEFFIELD

J. T. CHESTERMAN
M.R.C.P., F.R.C.S., F.A.C.S.
THORACIC SURGEON TO THE HOSPITAL

HERNIATION of bowel into the thorax after an injury has now been frequently reported; but comparatively little has been said about the cases in which, because there is no history of trauma, a diaphragmatic hernia and its strangulation go unrecognised for many hours.

Three Case-reports

FIRST CASE

AB, an apprentice engineer aged 17, had played association football regularly for some years. On Dec. 12, 1953, when jumping to head the ball, he felt sudden pain in the left side of the chest and abdomen. He jumped, and twisted to the right in the air; but he did not fall or collide with anyone. He played the game out and went to a hospital casualty department where it was thought that he might have fractured some ribs. His chest was strapped but no X-ray film was taken.

The pain persisted, and on Dec. 14 he was admitted to hospital (no. 53/28350). There was tenderness over the left chest laterally; peritoneal tenderness was greatest in the left midclavicular line at the level of the umbilicus. The mediastinum was central. Air entry was diminished, and there were atypical friction sounds below the inferior angle of the left scapula, but no peristalsis was heard. X-ray screening showed bowel in the chest but normal diaphragmatic movements, and the film confirmed that part of the colon was intrathoracic. The blood-pressure was 150/80 on admission, but after four hours' rest fell to 120/70.

When the left chest was opened through the bed of the 9th rib, the colon and spleen presented. They had herniated through the foramen of Bochdalek after rupture of the membrane. There was straw-coloured fluid in the chest and abdomen. The colon and spleen were replaced in the abdomen and the hernia repaired. The patient remains well.

In this case surgery was delayed 48 hours because the history taken in the casualty department was inadequate (it is unlikely that an otherwise healthy youth could fracture his ribs without a knock) and because, though fracture was suspected, no X-ray films were taken.

SECOND CASE

CD, a boy of 14, was a regular cross-country runner. On Oct. 28, 1956, he was admitted to hospital (no. 54/41746) with a history of sudden severe epigastric pain which had started 5 hours before, while he was changing after a $1^1/_2$-mile run. On Oct. 30 one of us (J. T. C.) was asked to see him. He had pain which was continuous in the left side of the chest and left shoulder and also in the left upper quadrant of the abdomen, radiating through to the back. In addition there was sometimes severe abdominal colic. Peritoneal tenderness was limited to the left hypochondrium. Rectal examination showed nothing abnormal. The mediastinum was markedly shifted to the right and there was fluid in the left chest. The blood-pressure on admission had been 170/120 but had fallen to normal levels.

Immediate thoracotomy was performed through the bed of the excised 8th rib and a sac containing 9 in. of gangrenous transverse colon presented. This had herniated through a small smooth-walled ring, 2 cm. in diameter, in the anterior part of the left leaf of the diaphragm. 11 in. of colon was resected and an end-to-end anastomosis made. The hernial orifice was closed. The patient was well when seen last May.

Here again surgery was delayed 48 hours. After admission the patient was transferred from a surgical ward to a medical ward where the left chest was aspirated in two places. The X-ray films were misinterpreted and the raised blood-pressure was considered strong evidence against an acute intra-abdominal surgical emergency. But in fact, in acute abdominal emergencies a rise of blood-pressure is not uncommon and a low blood-pressure is comparatively rare.

THIRD CASE

EF was a boy aged 2 years and 10 months. Apparently healthy, he was playing in the coalshed on March 26, 1957, and was said to have choked on a piece of coal at 6.30 P.M. At the time of this sudden onset of dyspnœa he was trying to lift a bucket which was far too heavy for him. Seen by the family doctor at 8.15 P.M., he was at once admitted to a children's hospital where he was found to have severe respiratory difficulty (due to mediastinal shift to the right) and hyperresonance in the left chest. This was attributed to a tension pneumothorax, and the X-ray films were thought to confirm this diagnosis. The chest was aspirated twice, and at the second attempt the needle was left in situ for several hours, but without relief.

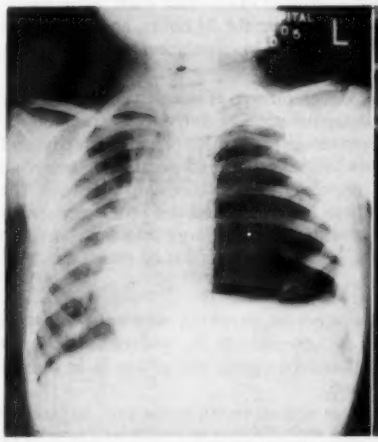

Fig. 1—Postero-anterior view, showing cyst-like appearance of gastric volvulus and the possibility of colon in the chest.

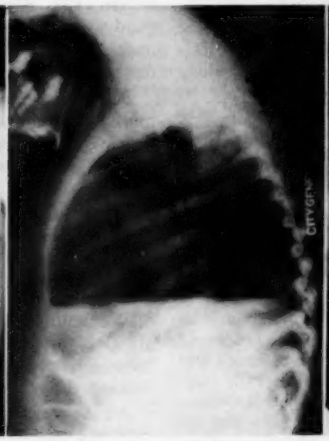

Fig. 2—Lateral view, with similar features.

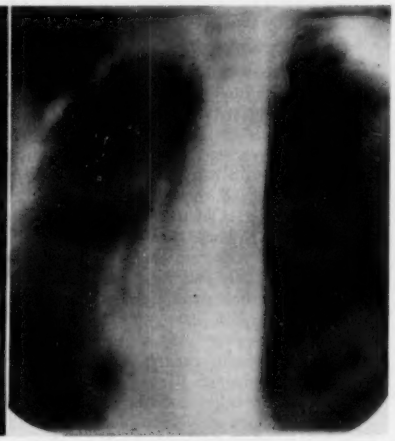

Fig. 3—Tomograph, showing outline of trachea and main bronchi, so excluding foreign body.

When seen by J. T. C. at 1.15 P.M. on March 27, he still had a hyperresonant left chest and mediastinal displacement. Abdominal examination showed no abnormality and his general condition was fair. The X-ray films (figs. 1 and 2) showed a cyst occupying the left side of the thorax and pushing the mediastinum to the right and the left leaf of the diaphragm downwards. Because of the depression of the diaphragm, the absence of the stomach bubble was not considered diagnostic.

He was transferred to the City General Hospital (no. 57/72666). Tomographs (fig. 3) were taken of the bronchial tree and showed no evidence of a foreign body. There were no abdominal symptoms or signs, respiratory distress being the presenting feature. Immediate operation was advised to deal with the intrathoracic "cyst". General anæsthesia was given by Dr. J. Johnston through a tube in the right main bronchus. When the chest was opened, through a left posterolateral thoracotomy, a volvulus of the stomach presented together with the spleen and a little transverse colon. These had passed through a left sided pleuroperitoneal canal. The anterior part of the hiatus was muscular, while the posterior part was fibrous and without a covering membrane. Reduction and repair were easy, convalescence was uneventful, and when last seen in April of this year, the child was clinically and radiologically normal.

Surgery was delayed 24 hours, and even then was performed, without the correct diagnosis having been made, because of the urgency of the symptoms. The radiographs were misinterpreted at two hospitals. The two points which should have suggested the true diagnosis were the thickness of the cyst wall on the X-ray film and the complete lack of relief after aspiration. One of us (J. T. C.) has noticed this latter point several times, and has never known aspiration fail to give some immediate relief in other conditions, however disastrous the consequences.

Conclusion

All our three patients were leading normal lives when disaster overtook them—playing football, changing after a run, and the infant lifting a heavy weight and choking over coal. Could anything be more normal? Yet, through lack of an accurate diagnosis, all three were operated on a day or two late.

We desire therefore to emphasise the importance of recognising this group of cases. Even if the diagnosis is not clear, early thoracotomy should be undertaken when such symptoms as these are found.

It is a pleasure to acknowledge our debt to Dr. E. K. Abbot for the radiography and Dr. J. Johnston for the anæsthesia.

"... I have seen parents and children sit side by side, morbidly watching—on the television screen—one man slowly and inefficiently strangling another, or a man and a woman shooting at each other. But commercially successful provision for morbid horror is, I would say, damaging at the worst, and, at best, simply no help to either children or parents because the feelings aroused, though strong, are not given in such a way as to help us to feel adequately in real living. Children's traditional nursery rhymes, on the other hand, and game rhymes, and *Punch and Judy*, are about violence, pain, death, and sex, suspended in lively and vigorous words. If these subjects are removed from their entertainment they will grow up too soft—for growing up is a great spiritual struggle for the child, who feels and knows more than we think he feels and knows, about love, death, human nature, and time. However much our *entertainment* suggests life *might* be more hideous with vampires, or on the other hand is really quite nice and innocuous with little Sooties and Noddies, we know all the time that life itself is real, earnest, terrible, and joyful, and that it needs above all to be faced with courage and energy."—DAVID HOLBROOK, *Listener*, Oct. 9, p. 553.

ŒSTROGEN AND PROGESTERONE LEVELS IN FŒTAL AND MATERNAL PLASMA AT PARTURITION

ELSIE H. AITKEN
B.Sc. Glasg.
RESEARCH ASSISTANT

J. R. K. PREEDY *
M.A., M.D. Cantab., M.R.C.P.
LATELY RESEARCH FELLOW

MEDICAL UNIT, LONDON HOSPITAL, LONDON, E.1

BRUCE ETON
M.D. Manc., M.R.C.O.G.
ASSISTANT TO THE OBSTETRICAL AND GYNÆCOLOGICAL DEPARTMENTS, UNITED CAMBRIDGE HOSPITALS

R. V. SHORT
Ph.D. Cantab., B.V.Sc. Brist., M.Sc. Wisconsin, M.R.C.V.S.
OF THE AGRICULTURAL RESEARCH COUNCIL UNIT OF REPRODUCTIVE PHYSIOLOGY AND BIOCHEMISTRY, DEPARTMENT OF VETERINARY CLINICAL STUDIES, UNIVERSITY OF CAMBRIDGE

DESPITE various theories, the cause of the onset of human parturition still remains in doubt (Reynolds 1949, Marshall and Moir 1952). Some theories have invoked alterations in the chemical state, or in the concentration of blood œstrogens or progesterone. On the basis of œstrogen analyses of urine in pregnancy, Cohen et al. (1935) suggested that labour might be caused by a change-over of circulating œstrogens from the "combined" to the "free" state. But later investigation (Clayton and Marrian 1950) suggested that the earlier finding of "free" urinary œstrogen at parturition was due to contamination of the samples with amniotic glucuronidase. More recently Brown (1956) has shown that œstrogen production, judged by urinary œstrogen estimations, remains high up to the day of parturition.

Haskins (1954) found that the progesterone content of the human placenta obtained at cæsarean section was approximately twice that of the placenta delivered normally. Using in-vitro and in-vivo techniques in the rabbit, Csapo (1956a and b), Bengtsson (1957), and Schofield (1957) demonstrated a decreased progestational activity in the myometrium just before birth. These findings suggest that both in the human and in the rabbit parturition may be associated with a fall in progesterone production. On the other hand, studies of urinary pregnanediol excretion by pregnant women have shown no sudden decrease of this progesterone metabolite before parturition (Gemzell et al. 1956, Appleby and Norymberski 1957, Russell et al. 1957). But such estimations yield a single integrated figure for 24 hours, and would not necessarily reflect alterations in circulating hormone levels towards the end of the period.

Because of the development of sensitive and specific methods for the determination of œstrone, œstradiol-17β, œstriol, and progesterone in human plasma (Preedy and Aitken 1957, Short 1958a), it seemed possible to establish with reasonable accuracy the relationship between the plasma levels of these hormones and the onset of parturition, and at the same time to gain more information about their maternal and fœtal metabolism at or near term.

Investigation

We studied twenty-nine pregnant women, who were divided into two groups—group A, undergoing elective cæsarean section (fourteen cases), and group B, in normal labour (fifteen cases).

All the patients were in good health at the time, and we had carefully excluded any with diabetes or toxæmia of pregnancy.

* Present address: Department of Medicine, Emory University, Atlanta, 3, Georgia, U.S.A.

In some there was slight ankle œdema, in others the blood-pressure was at the upper limits of the normal range for pregnancy, and in a few there was slight proteinuria; but these findings were too transient to be indicative of toxæmia of pregnancy. In case 2 mild essential hypertension was present before and during pregnancy. All pregnancies were single, and in none was labour induced artificially.

In group A cæsarean section was undertaken some time before the onset of labour for disproportion, malpresentation, bad obstetrical history, classical cæsarean scar, and, in one case, essential hypertension. Three cases were primigravidæ and the remainder were multigravidæ. The age range was 22–42 years. Atropine, thiopentone, tubocurarine chloride, suxamethonium, nitrous oxide and oxygen, and epidural and local lignocaine were variously employed for premedication and anæsthesia. Maternal blood was taken from the cubital vein after administration of the anæsthetic, but before incision of the uterus. All patients were given intramuscular ergometrine as the uterus was incised. Fœtal blood samples were taken from the cut placental end of the cord immediately after delivery of the fœtus. The time interval between collection of maternal and fœtal blood samples was 5–10 minutes.

In group B the age range was 19–38 years. Nine cases were primigravidæ and the remainder multigravidæ. The sedatives and anæsthetics variously employed were potassium bromide and chloral, 'Omnopon' and scopolamine, pethidine, and nitrous oxide and oxygen. Some patients had no sedative or anæsthesia. Maternal blood was taken from the cubital vein during the first stage of labour (except case 13, in which it was taken near the end of the second stage). Fœtal blood was taken from the cut placental end of the cord after delivery of the fœtus and before delivery of the placenta. The time interval between the taking of maternal and fœtal samples was 0–22 hours.

The blood samples were heparinised to prevent clotting, and immediately cooled to 5°C. Plasma was separated within 7 hours of collection and stored at −15°C until assayed. The levels of œstrone, œstradiol-17β, and œstriol were determined in 5 ml. samples of maternal and fœtal plasma by the method of Preedy and Aitken (1957). Preliminary recovery-rates for free crystalline œstrogens added to plasma before acid hydrolysis were in the range of similar recoveries from urine—namely, a mean of approximately 80% (Aitken and Preedy 1956). Progesterone levels were determined in 20–25 ml. of maternal plasma, and 5–12 ml. of fœtal plasma by the method of Short (1958a). The mean recovery-rate of progesterone added to plasma was 73%. The anæsthetic thiopentone did not interfere with either œstrogen or progesterone determinations.

TABLE II—PROGESTERONE LEVELS IN FŒTAL PLASMA

Case no.	Week of pregnancy	Sex of infant	Progesterone (μg. per 100 ml.)
Group A: Cæsarean section			
16	39	M	33·2
17	39	M	45·5
18	39	F	33·6
19	40	M	39·0
20	39	F	30·7
21	39	M	68·0
22	39	M	19·6
			Mean 38·5
			S.D. 15·2
Group B: Normal labour			
23	42	F	39·8
24	40	M	63·8
25	38	M	51·0
26	40	F	43·0
27	41	F	40·5
28	40	F	56·2
29	38	M	30·8
			Mean 46·4
			S.D. 11·2

Results are uncorrected for extraction losses.

Results

The concentrations of œstrone, œstradiol-17β, œstriol, and progesterone in maternal and fœtal plasma are shown in tables I and II. No correction has been made for losses during the extraction procedures. The figures in the upper half of each table refer to samples taken at cæsarean section, and in the lower half to samples taken during labour.

No significant difference ($P = > 0{\cdot}05$) was observed between the mean levels of any of the hormones when cæsarean section samples were compared with those taken during normal labour. But in both groups there was a highly significant difference ($P = < 0{\cdot}01$) between the mean levels of œstrone, œstradiol-17β, œstriol, and progesterone in maternal as opposed to fœtal plasma. The œstrone and œstradiol-17β levels were lower in fœtal than in maternal plasma, but the œstriol and progesterone levels were considerably higher in the fœtal plasma. These differences were apparent even when the œstrogens were determined in maternal and fœtal plasma from the same subject (cases 1, 3, 8, and 12). The sex of the infant had no effect on the hormone levels in either the mother or the fœtus.

The maternal plasma-œstrogen levels found during normal labour in this series do not differ significantly from those reported in late pregnancy (Preedy and Aitken 1957), but the œstrone and œstriol levels in maternal plasma at

TABLE I—ŒSTROGEN AND PROGESTERONE LEVELS IN MATERNAL AND FŒTAL PLASMA

Case no.	Week of pregnancy	Time prepartum	Maternal plasma (μg. per 100 ml.)				Fœtal plasma (μg. per 100 ml.)			Sex of infant
			Œstrone	Œstradiol-17β	Œstriol	Progesterone	Œstrone	Œstradiol-17β	Œstriol	
Group A: Cæsarean section										
1	39	—	43·0	3·5	25·5	16·0	1·98	<0·25	61·5	M
2	35	—	—	—	—	5·9	3·2	1·25	190·0	M
3	41	—	12·8	1·6	18·4	19·8	2·5	0·9	170·0	F
4	39	—	22·4	3·4	41·6	14·0	—	—	—	F
5	40	—	16·3	1·6	17·8	9·5	—	—	—	M
6	39	—	38·7	3·7	18·7	—	—	—	—	F
7	40	—	—	—	—	—	0·91	<0·25	141·0	M
		Mean	26·6	2·8	24·4	13·0	2·15	0·66	140·8	
		S.D.	13·5	1·0	10·1	5·4	0·97	0·50	56·5	
Group B: Normal labour										
8	41	5 min.	14·7	3·5	17·8	—	3·2	0·74	58·5	F
9	38	1¼ hr.	—	—	—	6·7	3·3	<0·25	145·0	F
10	40	3 hr.	—	—	—	10·4	6·1	0·71	229·0	M
11	39	22 hr.	3·4	1·9	19·8	9·6	—	—	—	M
12	39	2 hr.	17·8	3·7	18·8	17·8	4·2	0·78	98·0	M
13	38	Zero	—	—	—	11·8	1·0	<0·25	116·0	M
14	38	12½ hr.	10·1	1·2	17·3	—	—	—	—	F
15	40	2½ hr.	13·9	0·6	15·3	—	—	—	—	M
		Mean	12·0	2·2	17·8	11·3	3·6	0·50	129·0	
		S.D.	5·5	1·7	1·7	4·1	1·8	0·27	43·9	

Results are uncorrected for extraction losses.

cæsarean section are somewhat higher ($P = < 0.01$). No explanation for this discrepancy is available. The fœtal plasma-œstrogen levels are in agreement with those reported by Diczfalusy and Magnusson (1958).

The values for maternal plasma-progesterone in our study fall within the range previously reported by Zander (1955) for normal late pregnancy. The fœtal plasma-progesterone levels are similar to those found by Butt et al. (1951), Pearlman and Thomas (1953), and Zander and von Münstermann (1954).

Discussion

Since there is no significant difference between the two groups studied with respect to any of the hormones measured, it seems that, in the human, labour is not associated with any major alteration in the plasma concentrations of œstrone, œstradiol-17β, œstriol, or progesterone; nor is there any consistent difference in the œstrogen/progesterone ratio, which varies considerably from case to case.

These observations are compatible with the high urinary output of œstrogens and pregnanediol, which is normally maintained up to the time of parturition (Brown 1956, Gemzell et al. 1956, Appleby and Norymberski 1957, Russell et al. 1957). Since our observations were made throughout labour, it is probable that the placenta is still a fully functional endocrine organ at the time of its removal.

Evidence from experiments on rabbits suggests that the onset of labour is associated with decreased progesterone production. It is also known that progesterone injections will delay the onset of labour in the rabbit, whereas ovariectomy will precipitate it (Csapo 1956a). In the cow, there is a dramatic fall in the plasma-progesterone level several days before the onset of labour (Short 1958b). Our findings provide strong evidence against such alterations in the progesterone level just prior to the onset of human parturition.

It is interesting to consider the reasons for the high levels of œstriol and progesterone in the fœtal blood. Œstrone, œstradiol-17β, œstriol, and progesterone have all been isolated from the human placenta (Mitchell and Davies 1954, Salhanick et al. 1952), and therefore one might expect the fœtal levels of these steroids to be higher than the maternal levels. But the œstrogens present in fœtal blood are represented mainly by œstriol, whereas the œstrogens of the maternal blood and of the placenta contain considerable amounts of œstrone and œstradiol-17β in addition to œstriol. This seems to indicate that the fœtus is capable of rapidly metabolising œstrone and œstradiol-17β. In support of this theory, Diczfalusy et al. (1957) showed that when œstradiol-17β is administered to newborn boys, virtually no œstrone or œstradiol-17β can be detected in the urine. In a later study, Diczfalusy and Magnusson (1958) investigated the tissue concentrations of œstrone, œstradiol-17β, and œstriol in a large number of human fœtuses. They found that œstriol was the major œstrogen present in all tissues, and that the fœtal liver had a higher concentration of "free" œstrone and œstradiol-17β than any other organ. This was interpreted as evidence for the metabolism of placental œstrone and œstradiol-17β by the fœtal liver. The efficiency with which the human fœtus is able to metabolise placental œstrogens might protect it from the effects of excessive œstrogenic stimulation. Œstrogens administered during early embryonic life are known to produce permanent intersexuality in some species (Jost 1955).

Using deuterium-labelled œstrone Pearlman et al. (1954) found that the ratio of labelled œstrone/œstradiol-17β/œstriol in the urine was the same for pregnant and for non-pregnant women. But Brown (1957) showed that during pregnancy the urinary levels of œstriol increased at a much greater rate than the levels of œstrone or œstradiol-17β, and he interpreted this as evidence for œstriol production by the placenta. Our results suggest that at least part of this œstriol may be a reflection of the fœtal metabolism of placental œstrogens.

In contrast to the œstrogens, progesterone is probably not metabolised to any appreciable extent by the human fœtus. Even after the injection of progesterone, pregnanediol has not been detected in the urine of newborn children (Zander and Sloth 1953), and it is also absent from the amniotic fluid (Diczfalusy 1957). The compound 20α-hydroxypregn-4-en-3-one, a progesterone metabolite, has been isolated from the human placenta (Zander et al. 1957, Short 1957), and its presence is suspected in cord blood (Zander et al. 1958). In the present study it was not definitely detected in any sample of fœtal plasma.

We studied fœtal samples taken from the cut placental end of the umbilical cord which would contain mainly blood from the umbilical vein. If a steroid is either metabolised or synthesised by the fœtus, or is transferred across the placenta from the fœtal to the maternal circulation, considerable arteriovenous differences may exist.

Assuming that the cubital vein concentrations of œstriol and of progesterone do not differ greatly from those in the uterine artery, then it is probable that a concentration gradient exists across the placenta with respect to both these hormones. This would facilitate transfer into the maternal circulation, where œstriol is presumably destined for excretion, and progesterone for metabolism by maternal tissues.

Because of the higher concentrations of œstrone and œstradiol-17β in maternal plasma, there may be a tendency for these hormones to diffuse in the reverse direction—i.e., from maternal to fœtal plasma. But direct comparison between steroid concentrations in the maternal and fœtal circulations is complicated in the case of the œstrogens by the unknown distribution in plasma between "free", "protein-bound", and "conjugated" forms. Our analytical procedures measured only the total œstrogen present.

Summary

Œstrone, œstradiol-17β, œstriol, and progesterone levels in maternal and fœtal plasma were estimated at elective cæsarean section and also during normal labour.

There was no significant difference between either the maternal or the fœtal plasma levels of these hormones when cæsarean section and normal labour groups were compared. These findings suggest that human parturition is not initiated by any major alteration in plasma œstrogen or progesterone concentration.

The œstrone/œstradiol-17β/œstriol ratios in fœtal plasma were greatly different from those in maternal plasma; the fœtal plasma-œstriol levels were 5–6 times higher than the maternal levels, and the fœtal œstrone and œstradiol-17β levels were significantly lower.

The fœtal plasma-progesterone levels were 3–4 times higher than the maternal levels.

A concentration gradient may exist across the placenta with respect to œstriol and progesterone, and this may be concerned with the fœtal/maternal transfer of these hormones.

Our thanks are due to Miss J. E. Bottomley and Mr. Oswald Lloyd for permission to obtain samples from some of their patients, and to the staff of the Maternity Hospital, Mill Road, Cambridge, for help in the collection of samples. We are also grateful to Miss P. Beirne for valuable technical assistance.

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DECREASED 5-HYDROXYTRYPTOPHAN DECARBOXYLASE ACTIVITY IN PHENYLKETONURIA

C. M. B. PARE
M.D. Cantab., M.R.C.P., D.P.M.
SENIOR REGISTRAR,
BETHLEM ROYAL AND THE MAUDSLEY HOSPITALS, LONDON, S.E.5

M. SANDLER *
M.B. Manc., M.R.C.P
LECTURER IN CHEMICAL PATHOLOGY,
ROYAL FREE HOSPITAL MEDICAL SCHOOL, LONDON, W.C.1

R. S. STACEY
M.A., M.D. Cantab.
PROFESSOR OF PHARMACOLOGY AND THERAPEUTICS,
ST. THOMAS'S HOSPITAL MEDICAL SCHOOL, LONDON, S.E.1

THERE has been general agreement that the fundamental biochemical defect in phenylketonuria is a failure of hydroxylation of phenylalanine to tyrosine (for biochemical review see Dalgliesh 1955). But when Armstrong and Robinson (1954) demonstrated indolelactic acid in the urine of affected patients, it became evident that there was also a disorder of tryptophan metabolism.

In 1957 we provided data which suggested that a defect in the 5-hydroxyindole pathway of tryptophan metabolism was present in phenylketonuria (Pare et al. 1957). We found significantly low levels of 5-hydroxytryptamine (5-HT) in serum, and low levels of its major metabolite, 5-hydroxyindoleacetic acid (5-HIAA), in urine, and we postulated that this abnormality might play some part in the pathogenesis of the mental defect usually associated with the disorder. We tentatively suggested that these decreased levels might be due to competition between phenylalanine and tryptophan for the same hydroxylating system.

Recently, however, Davison and Sandler (1958) showed that 5-hydroxytryptophan decarboxylase, which converts 5-hydroxytryptophan (5-HTP) to 5-HT, is inhibited in vitro by certain aromatic acid metabolites of phenylalanine which are known to be produced in excess in phenylketonuria. If this inhibition were to occur in vivo, it might help to explain our findings. Conversely, if synthesis of these metabolites in phenylketonuric patients were reduced by means of a low-phenylalanine diet, increased production of 5-HT might be expected to follow.

The experiments to be described were designed to test these hypotheses.

Methods

Low-phenylalanine diet.—Seven phenylketonuric subjects, inpatients at a children's hospital, were studied. Serum and random urine specimens passed on the same day were obtained before, and at intervals during, a low-phenylalanine dietary regime (Woolf et al. 1958). Serum 5-HT, urine 5-HIAA, creatinine, and the indole-excretion pattern were examined by methods previously used (Pare et al. 1957).

5-HTP-tolerance test.—Intravenous administration of 5-HTP in man results in a characteristic urinary-indole excretion pattern (Davidson et al. 1957, Brengelmann et al. 1958). The urinary concentrations of 5-HT and of 5-HIAA may be regarded as an index of the functional activity of 5-HTP decarboxylase. Thus, in the presence of a depressed decarboxylase system, one might expect a greater proportion of unchanged 5-HTP to be excreted in the urine, with a consequent decrease in 5-HT and 5-HIAA output.

Four phenylketonuric children and four mentally defective children without phenylketonuria, matched for age, sex, and nutritional state, and living in the same hospital, were given 25 mg. of DL-5-HTP intravenously and urine was collected by indwelling catheter for timed periods before and after. Tests and analyses for each matched pair were carried out concurrently. 5-HT was measured by the colorimetric method of Udenfriend et al. (1955) as modified by Dalgliesh and Dutton (1957). 5-HIAA, creatinine levels, paper-chromatographic studies of urinary indoles, and serum-5-HT levels in specimens obtained simultaneously were estimated by methods used previously (Pare et al. 1957).

Results

Low-phenylalanine diet.—The results are shown in tables I and II. The serum 5-HT levels failed to rise in only one patient (case 1). If the means before and during the diet are compared, the values for serum 5-HT are seen to be significantly higher after the diet had started ($P < 0.02$). There is no significant difference ($P > 0.1$) between the means of urinary 5-HIAA excretion values.

TABLE I—SERUM-5-HT, EXPRESSED AS NG. PER ML., BEFORE AND AFTER STARTING LOW-PHENYLALANINE DIET

Case no.	Before diet	After starting diet (weeks)				
		1	2	3	4	Mean
1	23	38	24	18	6	21·5
2	38	..	96	136	207	146
3	150	240	..	144	264	216
4	74	99	176	263	..	179
5	95	134	..	..	170	152
6	85	110	..	..	..	110
7	165	180	163	..	..	172
Mean	90					142·3

* Present address: Queen Charlotte's Hospital London W.6.

TABLE II—URINARY EXCRETION OF 5-HIAA, EXPRESSED AS MG. PER G. CREATININE, BEFORE AND AFTER STARTING LOW-PHENYLALANINE DIET

Case no.	Before diet	After starting diet (weeks)				
		1	2	3	4	Mean
1	5·6	4·7	..	13·8	12·3	10·3
2	7·9	16·5	7·1	6·2	5·9	8·9
3	11·6	..	12·4	..	15·9	14·1
4	4·7	..	..	1·0	..	1·0
5	6·0	9·0	8·0	..	9·8	8·9
6	4·3	15·0	32·9	..	..	23·9
7	3·5	9·8	10·0	..	..	9·9
Mean	6·2					11·0

The rise in serum 5-HT levels can be seen more clearly when a straight line ($y = mx + c$) is fitted to the data for each individual by computing the regression of 5-HT (y) values on time (x). The mean is shown in fig. 1.

Indolelactic acid, demonstrated chromatographically, was present in every patient before the diet and disappeared within a week of its commencement. No other abnormal indoles were present.

5-HTP-tolerance test.—Because some urine was lost through leakage round the catheters, absolute values for the excretion of indoles could not be compared. The results are therefore expressed as mg. of 5-HT per g.

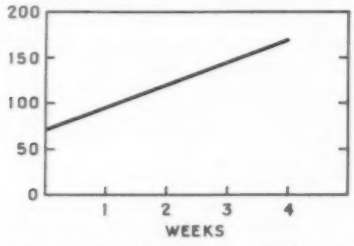

Fig. 1—The average rate of increase of serum-5-HT after starting a low-phenylalanine diet, obtained by applying the formula $y = mx + c$ to the data from individual phenylketonurics.

creatinine and mg. of 5-HIAA per g. creatinine, and are recorded in figs. 2 and 3. The phenylketonurics gave appreciably lower peaks for the excretion of 5-HT (two pairs) and 5-HIAA (four pairs). One of these pairs (A) shows remarkably high 5-HT peaks, but these two children had the lowest body-weight of the whole group.

Two of the graphs show more than one peak. The explanation for this is obscure and has not yet been further investigated.

The rise in urinary 5-HT and 5-HIAA was confirmed qualitatively by paper chromatography. This also showed unchanged 5-HTP in postinjection samples, which was presumably largely the unchanged D-isomer.

Serum 5-HT levels showed no consistent change after the injection of 5-HTP. There were no clinical side-effects attributable to the 5-HTP injection.

Discussion

The investigation was designed to examine further the decreased 5-hydroxyindole production which we described in phenylketonuria (Pare et al. 1957). This might be due to impaired hydroxylation of tryptophan, as suggested originally, or to an inhibition of 5-HTP decarboxylase by phenylacetic acid, phenylpyruvic acid, and phenyl-lactic

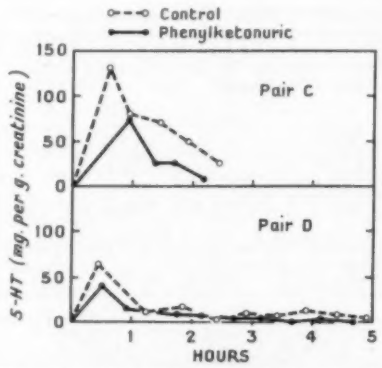

Fig. 2—Urinary excretion of 5-HT in phenylketonurics and matched controls, after giving 25 mg. of 5-HTP intravenously.

acid, which has been shown to occur in vitro (Davison and Sandler 1958). These acids are excreted in excess in phenylketonuria.

A low-phenylalanine diet decreases the production of these metabolites (Woolf et al. 1958), and would thus be expected to correct any inhibition of 5-HTP decarboxylase. Our observation of a rise in serum-5HT levels after the diet had begun accords with this prediction, but could equally well be explained by diminished competition between phenylalanine and tryptophan for hydroxylation. The absence of any significant difference between the means of the 5-HIAA excretion values before and during the diet may be related to the use of random specimens of urine and the variation in 5-HIAA output from hour to hour (unpublished results). Also the high 5-HT content of bananas (Waalkes et al. 1958) was not known at this

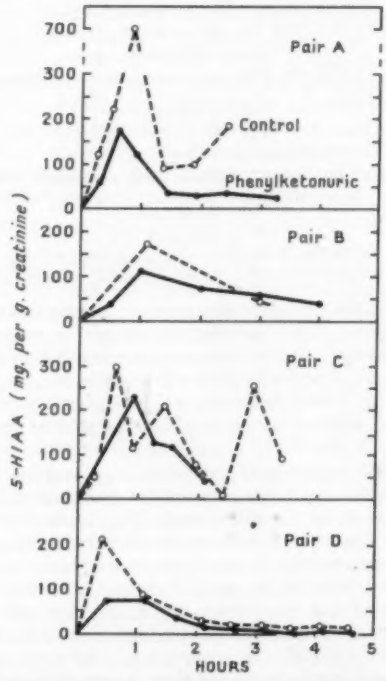

Fig. 3—Urinary excretion of 5-HIAA in phenylketonurics and matched controls, after giving 25 mg. of 5-HTP intravenously.

time, and consumption of these may have introduced errors into the pre-diet values.

Decarboxylase activity was tested directly by tolerance tests with 5-HTP. The diminished peaks in the excretion of 5-HT and 5-HIAA observed in phenylketonurics are in agreement with the postulated inhibition of the enzyme in this condition. Further evidence of this inhibition is provided by the finding of Sandler and Close (1958) that the administration of phenylacetic acid to a patient with a presumed 5-HTP-secreting carcinoid tumour depressed 5-HT and 5-HIAA excretion.

Other investigators (Davidson et al. 1957) have found that the serum 5-HT level did not rise after one challenge with 5-HTP. Repeated dosage with 5-HTP, however, will bring about such a rise (unpublished observation).

A diminished decarboxylation of 5-HTP in untreated phenylketonurics might be expected to result in a build-up of this substance in the blood and an overflow into the urine. But the chromatographic method employed in the present investigation was not sensitive enough to detect the very small increase in urinary 5-HTP likely to occur.

If our hypothesis is correct, how are we to view it in relation to the pathogenesis and possible dietary alleviation of the mental defect?

We have suggested that mental deficiency in phenylketonuria is associated with impaired 5-HT synthesis, rather than with any direct action of toxic metabolites of phenylalanine (Pare et al. 1957). If this were the case any benefit achieved by the low-phenylalanine diet might be due to an increased synthesis of 5-HT. Workers experienced in this treatment have suggested that the best results are obtained in the youngest children (Hsia et al. 1958, Woolf et al. 1958). It may be that exposure to toxic metabolites of phenylalanine eventually results in irreversible inhibition of 5-HTP decarboxylase. The failure of one of our patients (case 1) to show a rise in serum 5-HT after a restricted phenylalanine intake might be due to such an irreversible inhibition.

Summary

The effect of a low-phenylalanine diet was studied in seven phenylketonuric children. There was a significant rise in the mean serum-5-hydroxytryptamine level under this dietary regime.

After intravenous 5-hydroxytryptophan injection, four phenylketonuric children showed a lower urinary output of 5-hydroxytryptamine and 5-hydroxyindoleacetic acid when compared with matched controls.

These results suggest that 5-hydroxytryptophan decarboxylase might be inhibited by abnormal metabolites of phenylalanine in phenylketonuria.

We are grateful to Prof. A. A. Moncrieff and the research committee of the Hospital for Sick Children, Great Ormond Street, and to Dr. B. H. Kirman of the Fountain Hospital for their kind cooperation and for referring their patients to us; to Dr. L. I. Woolf for help in obtaining clinical material; to Miss Lilith Emslie and Miss Doreen Crabtree of the Royal Free Hospital for skilled technical assistance, and to the Royal Free Hospital endowment fund and Roche Products Ltd. for defraying their respective salaries. Roche Products Ltd. also provided supplies of 5-hydroxytryptophan.

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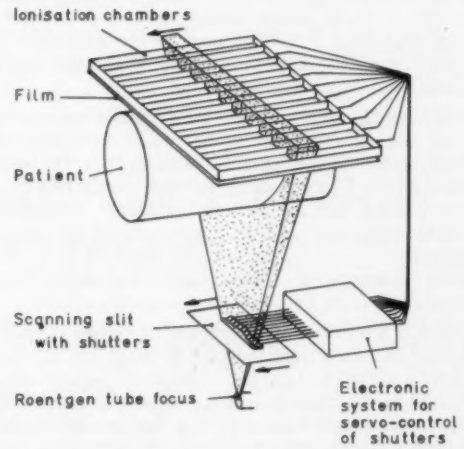
AUTOMATIC DODGING
OF X-RAY EXPOSURES TO REDUCE THE DOSE AND INCREASE THE INFORMATION

BERTIL JACOBSON
M.D.
ASSISTANT PROFESSOR OF MEDICAL ELECTRONICS, KAROLINSKA INSTITUTET, STOCKHOLM, SWEDEN

THE current discussion of radiation hazards from atomic fallout has drawn attention to the far greater problem of the high doses of radiation given during diagnostic X-ray procedures. Many improvements can be made in order to reduce the dose and increase the information obtained at each exposure. An investigation of contrast-enhancing methods showed that there are optimum wavelengths for obtaining the maximum amount of contrast per dose given (Jacobson and Mackay 1958). Similarly there is an optimum exposure-time.

The desirable properties of a system for setting the exposure are:

(1) The system should be entirely automatic so that no unnecessary re-exposures need be made. When human judgment is involved there will always be occasional erroneous exposures, from which the patient will receive an unnecessarily large dose of radiation.



Method for automatic dodging of X-ray exposures by feedback.

(2) There should be compensation for the variations in tissue-absorption within the image. Thus, for example, it should be sufficient to make only one lateral exposure of the skull in order to study both the high-absorption areas in the base and the low-absorption areas in the nasal bones. This process is analogous to the photographic technique known as "dodging". A comparable system for X-ray exposures would allow the passage of exactly sufficient quanta in each bulk area of the object, and thus give the minimum dose necessary for the

DR. PARE & OTHERS: REFERENCES—*continued*

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proper exposure of the film. Moreover, because the number of exposures needed in each case would be less, the film costs would also be reduced.

(3) Local contrasts should still be large, and preferably larger than with ordinary techniques. Automatic dodging of varying bulk intensities would allow the use of films with higher gamma values, which will increase the local contrasts.

A system that satisfies the above criteria is shown in the accompanying figure. The X-ray focus, the patient, and the film are all fixed in position. A slit-shaped window, allowing only a flat, narrow beam of X rays to pass the object, is placed in front of the tube. At each exposure the slit moves so that the beam scans the patient once. A number of tiny shutters are placed in front of the slit. At each instant during the scanning, these shutters allow the exact amount of radiation to pass for optimal exposure of the corresponding film area. The shutters are controlled by an electronic feedback system from a number of ionisation chambers (or scintillator photomultiplier units) which sense the amount of radiation leaving the patient. Each shutter has a corresponding sensing unit, though there is some overlap. The sensing units are placed behind the screen/film combination, since sufficient quanta penetrate it. Each shutter controls an area of about 1 sq. cm. of the image at each instant of the scanning. No images of the shutters appear on the film, since they are placed close to the tube focus.

Experiments with a simple one-channel system have proved that the system works. In this a servo-controlled plastic wedge served as the "shutter". The wedge attenuated the X-ray beam so that the scintillation from a screen behind the film became constant. Two-dimensional scanning was used, although it would be necessary in practice to employ a one-dimensional scan with several parallel channels of X-ray beams as indicated in the figure.

Another advantage of the suggested system is that the scattered radiation from the narrow beam can be eliminated by a second moving slit between the patient and the film. Thus the contrast is not reduced by scatter. The main disadvantage of the system is that any movement of the object during scanning will cause distortion of the contours, as in kymography.

The load on the tube will increase by a factor equal to the ratio of the width of the film to the width of the X-ray beam projected on to the film (the lengths of the film and the beam are equal). This might necessitate the construction of new types of tubes. The choice of tubes must be considered also in order to determine the optimum wavelength for reducing the dose. Tubes capable of carrying larger currents than the present ones would be required in both cases.

An alternative way of avoiding the heavy load on the tube, a moving slit, and the undesirable kymographic effect should be mentioned. A square matrix of shutters is placed in front of the tube focus. Each shutter is closed after the proper exposure-time, which is monitored by the current from a 'Vidicon' tube viewing the back transparent intensifying screen. The scanning cycles of the vidicon tube are synchronous with the activation cycles of the shutters. Integration of the intensity in each area controlled by a shutter is obtained throughout a complete scanning cycle. This system makes possible only a slight reduction of scattered radiation as compared with ordinary radiographic techniques. The advantage of using a vidicon tube is its storage properties.

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SALMONELLA DUBLIN SEPTICÆMIA

MARJORIE H. BOYLE *
M.B. Belf., D.C.H.
SENIOR HOUSE OFFICER, ROYAL BELFAST HOSPITAL FOR SICK CHILDREN

Salmonella dublin septicæmia in infancy is rare. The usual manifestations of a *S. dublin* infection are those of a gastroenteritis, and large outbreaks, like that of 600 cases described by McCall (1953), are not uncommon. The following case is interesting in that it shows features of both types of illness and presented a diagnostic problem.

Case-record

The patient was born on Nov. 14, 1956, the first child of healthy parents. He was artificially fed on National dried milk, the water for his feeds being drawn from a well and usually, but not invariably, boiled. He had an ice-cream two days before the onset of his symptoms. He had no illness, except bronchitis, until July 14, 1957, when he had diarrhœa for twelve hours, and two convulsions. He was admitted to hospital.

His rectal temperature was 104°F, but there were no abnormal physical signs. Three chest X-rays, three stool cultures, urine analysis, cerebrospinal-fluid examination, and white-cell count were normal. Biopsy of an axillary gland showed B.C.G. reaction. His temperature fluctuated between 105°F and 98°F, in spite of short courses of neomycin, chloramphenicol, streptomycin, and tetracycline. There appeared to be a temporary response to chloramphenicol. On Aug. 4, 1957, numerous red raised indurated skin lesions appeared.

Multiple skin abscesses.

On Aug. 21 he was transferred to the Royal Belfast Hospital for Sick Children. He was pale and toxic with a rectal temperature of 102°F and pulse-rate of 124. The only other abnormality was the multiple raised purulent-topped skin nodules on his limbs and face. The spleen was not palpable.

Hæmoglobin was 7·2 g. per 100 ml., white cells 9800 per c.mm. (51% polymorphs, 49% lymphocytes). Bone-marrow showed normal erythropoiesis with much myeloid hyperplasia. Urine analysis, urine culture, and stool culture on admission were normal. A swab from a skin lesion grew hæmolytic staphylococci and *Staphylococcus albus*, sensitive only to erythromycin and novobiocin. Biopsy examination of a nodule showed a subacute inflammatory reaction.

His temperature remained swinging while he was given erythromycin for three days, novobiocin for two days, and streptomycin and isoniazid for two days.

S. dublin (sensitive to chloramphenicol, streptomycin, neomycin, and tetracycline, and resistant to novobiocin) was isolated from fæces on Aug. 27 and from the skin lesions on Aug. 31. A blood-culture, done on admission, also grew *S. dublin*.

* Present address: Montreal Children's Hospital, Canada.

On Aug. 30 he was started on chloramphenicol 200 mg. six-hourly and prednisone 10 mg. six-hourly, the dose of prednisone being reduced after a few days.

On Sept. 3 he was transferred to the Northern Ireland Fever Hospital where chloramphenicol was continued for seventeen days with considerable improvement, although the organism was isolated from the stools on two further occasions.

On withdrawal of the drugs his temperature rose again and new skin lesions appeared. He was then given tetracycline 125 mg. six-hourly orally for twenty-one days. When the drugs were withdrawn he again relapsed and the organism was again isolated from the stool. After a further forty days' tetracycline he remained apyrexial, no new skin lesions formed, and stool, blood, and skin cultures were repeatedly normal. However, the abscesses on his right buttock broke down to form a sinus.

On Feb. 12, 1958, he was returned to the Royal Belfast Hospital for Sick Children where the sinus was excised and healed slowly.

On Feb. 18, 1958, agglutination against *S. dublin* was: H-antigen titre 1/160, O-antigen titre 1/320.

He was kept under observation and discharged home extremely well on June 8 (eleven months after admission to hospital).

Urine and fæces taken from the parents early in his illness failed to reveal any pathogens, nor did the parents have any gastrointestinal symptoms.

Discussion

The septicæmic form of *S. dublin* infection is usually sporadic and is not often associated with the symptoms of food-poisoning, nor is the organism generally isolated from the stool. In this case, not only was the illness heralded by diarrhœa, but the organism was grown from the stool four months after the onset of symptoms, and after prolonged antibiotic treatment. The organism was also isolated from the skin lesions on several occasions. *S. typhimurium* isolated from skin lesions in a dog has been reported by Phillips (1953), but although metastatic abscesses have often been described in adults, especially in bones, they are not common in children. The recurrence of skin lesions in this case was a good clinical index of relapse.

Many authors have advocated the combined use of cortisone and chloramphenicol in the treatment of salmonella infections. Choremis et al. (1956), in a detailed comparison of 100 cases of typhoid fever treated with chloramphenicol alone, and 100 cases treated with a combination of chloramphenicol and cortisone, have shown that combined therapy shortens the duration of the illness, reduces the incidence of relapses, and improves the prognosis by diminishing the danger of complications.

Although this patient was ill for six weeks before a diagnosis was established and was extremely ill before specific treatment was instituted it was disappointing that he had two relapses and a prolonged illness.

Summary

A child of 8 months with *Salmonella dublin* septicæmia recovered after prolonged treatment. An unusual feature of simultaneous isolation of the organism from blood, skin, and fæces, is discussed.

I wish to thank Dr. W. A. B. Campbell, consultant pædiatrician, Royal Belfast Hospital for Sick Children, and Dr. F. F. Kane, consultant, Northern Ireland Fever Hospital, for their encouragement and permission to publish this case.

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Reviews of Books

Pathology for the Physician

6th ed. WILLIAM BOYD, M.D., LL.D., D.SC., F.R.C.P., F.R.C.S.C., professor emeritus of pathology, University of Toronto. London: Henry Kimpton. 1958. Pp. 900. £6 6s.

THIS is much more than a new edition of *The Pathology of Internal Diseases*, since, to accommodate the technical advances of eight years and to reflect the changes in outlook between the various branches of medicine, Professor Boyd has rewritten widely, presenting pathology as the sum total of all the changes. Many chapters open with sections on general considerations in which the latest advances in anatomy, physiology, and biochemistry are sketched so that the later morphological and biochemical pathology can be more easily considered. To write a fine book and then twenty-five years later bring it completely up to date in all branches of the subject and all related subjects is a superlative achievement.

Perhaps especially suitable for physicians, who are not repeatedly seeing morbid anatomy, Professor Boyd's descriptions are full of apt similes and metaphors, and his illustrations are consistently excellent. His often unorthodox and challenging views, presented in a vigorous and stimulating way, give a freshness to pathology not often found in large textbooks. On occasion, he presents both sides of controversial problems but it is usually plain where his own sympathies lie, as, for example, concerning the connection between smoking and cancer of the bronchus. Most of the references given in each section are recent. Occasionally authors mentioned in the text or even acknowledged for illustrations are not given in the lists—no doubt by oversight. The author has had more than his share of bad luck with misprints.

This exposition of pathology can be strongly recommended to physicians and to pathologists, who will need their best endeavours to answer the challenges it presents so well.

Neurotic Distortion of the Creative Process

LAWRENCE S. KUBIE, M.D., clinical professor of psychiatry, Yale University School of Medicine. Lawrence, Kansas: University of Kansas Press. 1958. Pp. 151. $3.

Professor Kubie, a distinguished psychoanalyst with the gift of lucid exposition, sets out to show that mental instability is not a necessary corollary to creative activity, whatever the erratic behaviour of some famous artists might suggest. In fact, he says, neuroticism inhibits creation. Creative artists or scientists need not fear that psychoanalysis will diminish their work; rather will it, Kubie says, set them free from the bonds of neurosis. The artist often produces, unaware, material from his unconscious, and may parade his disorder before the world. The same mechanism may similarly define his individual "style" and lead to repetition in his work. Kubie says that the preconscious is the vital area for creation; spurred on by the unconscious and criticised by the conscious, it must be made free of distortion and obstruction by self-knowledge. Of special interest are his views on the creative function of free association. He quotes many interesting examples and the book (which is beautifully produced) will certainly convince the converted. The uncommitted, however, will be disappointed to see that "proof" of these interesting ideas is by no means conclusive, and the critical will remain unconvinced.

The value of the type of self-knowledge described by Kubie is uncertain: certainly there are severely neurotic people with creative talent for whom most psychiatrists would advise psychoanalysis. But to advise it indiscriminately may do more harm than good: Kubie does not discuss the type of patient who gets so involved in the transference relationship that effective work ceases. The book is, in fact, too uncritical: analysis is not a panacea, and until analysts are a little more open about the types of case that do well and those that do not, their important contributions will not command the respect they deserve.

Public Health in Tropical Countries

OLADELE A. AJOSE, M.D., D.P.H., professor of preventive and social medicine, University College, Ibadan, Nigeria. London: J. & A. Churchill. 1958. Pp. 191. 18*s*.

THIS book is intended as a textbook for students up to the standard of the M.B. examination and as an introduction to the subject for health inspectors. It should answer its purpose very well. It is designed on orthodox lines and is short, clear, and free from padding. The pictures are well chosen but there should be more of them. A simple line drawing of, for example, an Otway pit, takes up less space than a written description and tells a good deal more. Enlarged pictures of insects should give some indication of the natural size. The chapter on diets is excellent, but some tabulations (e.g., of the composition of local foods) would make for clarity. It is curious that there is no mention of the shortage of protein common in tropical diets. Vital statistics in many emergent countries are scanty, misleading, or both: the author makes a reasonable plea for more interest in a subject which is at least "vital" to an improvement in health.

This is not intended as a practical handbook for the man who must direct the making of a water-supply, nor does it reach the standard required by the student for the D.P.H. examination. When a second edition is needed the author might consider limiting its scope to tropical Africa. "Tropical medicine" is today an anachronism. As knowledge expands it is clear that the problems of public health in Nigeria have not much more in common with those of Bengal or Panama than with those of Finland, and cannot usefully be described in the same book. The parochial approach may seem retrograde, but it is more informative and more generally useful.

Modern Medical Discoveries

J. G. THWAITES, M.B., assistant editor, *The British Medical Journal*. London: Routledge & Kegan Paul. 1958. Pp. 234. 30*s*.

A BOY may leave school armed only with meagre knowledge and yet make a financial success of his life. But if he is to play his full part in the modern world, as the head of a family and a responsible citizen, he must know more, and often a highly technical "more", about such complexities as immunity reactions and the possible hazards of radioactivity. It is to equip those in their last years at school with this background information on modern medicine that this admirable book has been written.

An author who is also the assistant editor of a leading medical journal is in a vulnerable position, for his readers positively demand of him an effortless familiarity with every aspect of medicine and much else besides. But Dr. Thwaites is more than equal to this alarming situation. His chapters on anæsthesia, radiology, and genetics, for example, are outstanding expositions of difficult subjects, and the number of facts contained in each is remarkable.

In his preface Dr. Thwaites owns to "a great respect for the knowledgeableness of school leavers". Doubtless he is right, and young people of seventeen will assimilate his book with ease. But our sympathy is with those doctors whose children will presently bring it home and invite them to comment, for instance, on the definition of an allele or to distinguish between the mode of action of succinylcholine and decamethonium derivatives. Such ill-fated parents would be well advised to get a good look at this book as soon as they can.

The Biology of Hair Growth

Editors: W. MONTAGNA, R. A. ELLIS. New York and London: Academic Press. 1958. Pp. 520. $15. £5 7*s*. 6*d*.

THE pilary system is a complex microcosm of wide biological significance. This was soon discovered by lay reporters who strayed into the scientific sessions of the conference on the biology of hair growth held in London last year under the ægis of the British Society for Research on Ageing. This book, only one chapter of which is directly concerned with the effects of ageing on the scalp, is based on contributions to the conference by 23 distinguished workers in this subject, 10 of whom have been attached to British institutions. The embryology, morphology, and histochemistry of the system are considered, with information derived from autoradiography and electron microscopy. Nutritional factors in sheep, endocrine influences in rats, and genetic, racial, sex, physical, and chemical effects in man are discussed. Three chapters are devoted to pigment formation. Full lists of references adorn each chapter, and there are many helpful illustrations and comprehensive indexes. The book brings together much of our modern knowledge on the subject and should be of great value to biologists and scientifically minded dermatologists.

Allergie

3rd ed. Editor: Prof. K. HANSEN, Lübeck. Stuttgart: Georg Thieme. 1957. Pp. 1211. DM 187.

AFTER a lapse of fifteen years a new edition of this standard work has appeared. 24 clinicians and pathologists have contributed to a much enlarged text. The sections by Roessle, Klinge and Fassbenger, Schmidt, and Hansen dealing with morbid anatomy, experimental work, serology, and functional pathology are particularly good. The term "allergy" is used according to the definition of Pirquet, and it is not applied as if synonymous with hyperergy, as by many workers. Diagnostic procedures are described in detail, and the clinical aspects are dealt with organ by organ. Kundratitz, who now holds Pirquet's chair in Vienna, contributes a thorough discussion of allergy in childhood. A distinction is usually clearly drawn between conditions in which the presence of antibodies—circulating or sessile—is demonstrable and those in which an allergic origin is deduced from the clinical history.

A few words of criticism may be added. The work of Ranke and Pagel is mentioned in one sentence only. Although Ranke's original stage division of tuberculosis cannot be maintained, his and his pupils' work contributed to the understanding of tissue reactions in various forms of allergy. The problem of positive anergy in sarcoidosis is not discussed. The work on experimental allergic demyelinisation deserves a more detailed treatment. The fascinating work of recent years on defective glutathione metabolism and deficiency of 6-glucose-phosphate dehydrogenase as the basis of allergic hæmolytic anæmia in primaquine hypersensitivity and favism is not mentioned, probably because the manuscripts were completed before 1956. The printing and illustrations, many in colour, are excellent.

An Introduction to General Practice (2nd ed. London: H. K. Lewis. 1958. Pp. 584. 45*s*.).—In his vigorous foreword, reprinted unchanged from the first edition, Sir Heneage Ogilvie describes the "resurgence of general practice" as "the most significant feature of medical life at the present time." That Dr. Denis Craddock's book has achieved a second edition in five years suggests strongly that the resurgence is real and continuing; for this is essentially a book for the "good doctor", humane in his outlook and competent in a wide clinical field. The second edition is modelled closely on the first but shows evidence of careful revision. A few more clinical conditions and a number of additional "drugs and potions" are considered, but the 30 new pages are distributed among several chapters. The quality of the paper is improved; price and format are unchanged. The book can be warmly recommended, whether for continuous reading or for reference. It has a good index, and justifies its author's claim to contain "some reference to all conditions which the average general practitioner sees once a year". They are satisfyingly numerous and varied.

Scientific and Learned Societies of Great Britain (London: Allen & Unwin. 1958. Pp. 215. 35*s*.).—This handbook is the post-war derivative of the *Yearbook of Scientific and Learned Societies*. It is edited by the British Council, who have interpreted their responsibilities generously and to the list of individual societies have added a list of the principal organisations (other than university departments and commercial firms) who are officially sponsoring scientific research in Great Britain.

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in Migraine

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"And your hair has become very white;
And yet you incessantly stand on your head—
Do you think, at your age, it is right?"

"In my youth," Father William replied to his son,
"I did it to cure the migraine;*
But now—why, I do it entirely for fun,
And take Cafergot when I'm in pain."

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BY **SANDOZ**

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* Standing on one's head is reputed to be a good cure for migraine[1] —but not every patient is so agile.

[1] *Brit. med. J.* (1957) 2, 633

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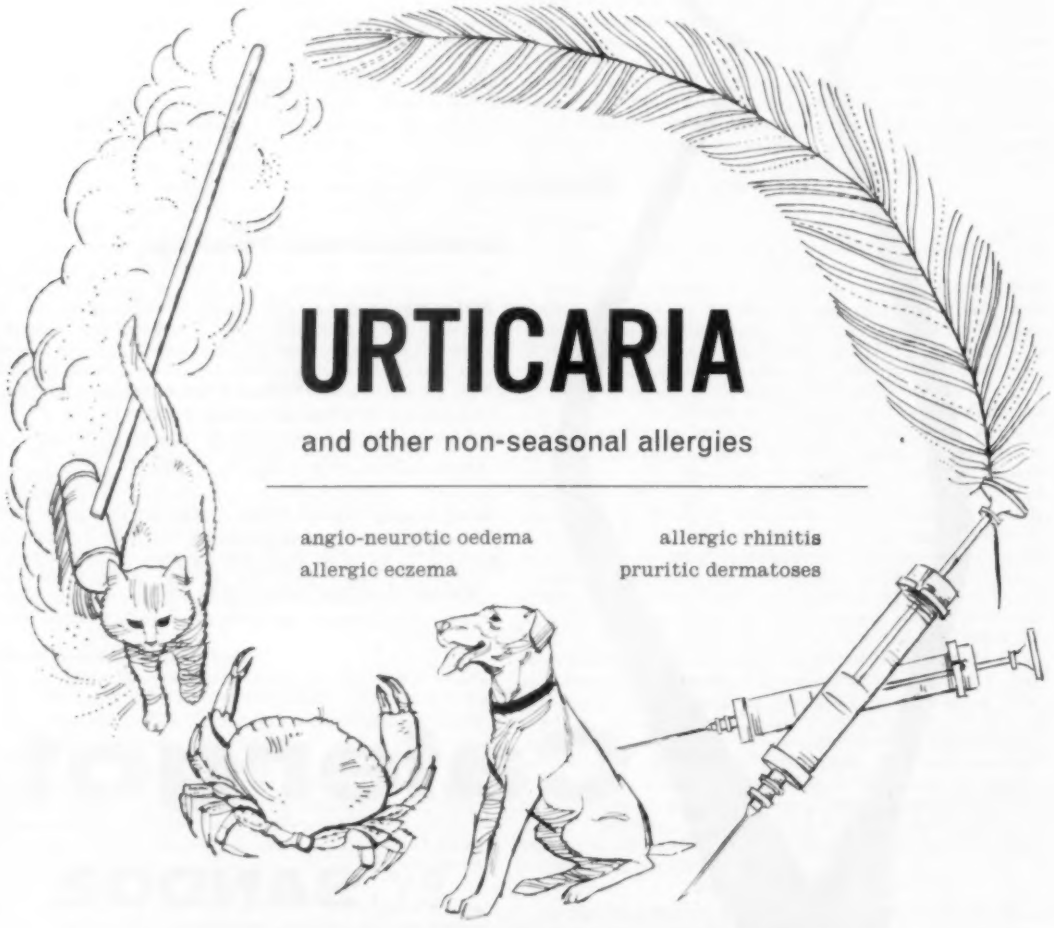

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Centenary of the G.M.C.

THE first Medical Act seemed at the time very unsatisfactory. It was passed a hundred years ago, not by an inspired legislature, but by Houses sick and tired after twenty-four years of agitation, two Select Committees, and the discussion of seventeen abortive Medical Bills. The Act pleased nobody: it was, throughout, a series of compromises. And that was a most fortunate thing, in no respect more so than in the nature of the General Council of Medical Education and Registration of the United Kingdom which it instituted. The members of the Council were defined so as to make them, as far as possible, both widely representative of conflicting interests and individually distinguished. They were all medical men. The Council was free from political control: it could call for information, it could advise, it could report to the Privy Council to have action taken, but it could not compel.

The result of all this was that it proceeded slowly. Despite the conflicting interests of its members it was careful not to indulge in civil war, and it soon settled down into a corporate entity. Some of its beneficial acts, such as making registered qualifications valid in any part of the Kingdom, were the effect of the Act rather than the Council; some, such as the insistence on preliminary education, of which the Council was at one time vocally proud, were quite illusory: the complaint about illiterate medical students, first heard in 1862, has gone on, even more loudly, ever since. But it did admirable work for medical education, especially in its first twelve years. Its power to send visitors to examinations (though not, at that time, medical schools) had a most salutary effect, which was enhanced by the wise decision to appoint more and more of the visitors from outside its own membership. Another sound procedure adopted by the Council resulted from its power to approve curricula for registrable qualifications as "sufficient", without the power to prescribe a curriculum. To help the licensing bodies to devise "sufficient" curricula, the Council issued Recommendations to guide them. These had the force, almost, of law, but they left latitude in the interpretation. In the end, the resulting elaboration of curricula by continual additions led to the great advance of the short and elastic Recommendations of 1957, which, for the first time, encourage experiment in medical education.

The Council went through a bad period between 1870 and 1886, in spite of the presidencies of two great men, Sir GEORGE PAGET and Sir HENRY ACLAND, because, instead of continuing with the improvement of education, it tried to proceed by legislation which would amend the Medical Act and substitute one national qualification for the many licensing bodies. This effort was defeated by the common sense of Sir WILLIAM TURNER, who later became president of the Council, which returned to more constructive activities.

It is interesting that the Council is associated in the mind of the public with what was, originally, one of its very minor functions—its judicial and disciplinary duty. The Medical Act provided, quite incidentally, that the Council, which put the names of those duly qualified on to the Register, should if necessary be able to remove the names of those who had been guilty of actions which made them unworthy of the privileges resulting from registration. This power of bringing professional offenders to judgment, exercised at first very sparingly, gradually grew. Partly because professional solidarity increased—a growth to which the Council contributed not a little—and partly because the Council did not like washing dirty linen in public, it was not until the '90s that the profession began to feel that it was more important to remove scandals than to preserve a façade. The general public, which has never been very clear about the precise nature of the General Medical Council (many people think it is synonymous with the Royal Society of Medicine or the British Medical Association), could understand without difficulty its judicial and disciplinary functions, and so seized on the notion of an arbitrary and largely amateur court, from which there was no appeal, which persecuted doctors who indulged in what, to them, were hardly even venial sins, such as canvassing. A great deal of the popular dislike which the Council has had to face comes from this source.

The significance of all that is this: the Council, which until recently consisted exclusively of medical men, and still does overwhelmingly, has to do its best in a legal role to which it is, in essence, unaccustomed. Doctors are not lawyers, and in habits of mind are extremely unlike them. But the Council has exercised its quasilegal function with great fairness and discretion; and it is a great advantage to the profession, and indirectly to the public, that the disciplinary control of the profession should be in its own hands. The same is true of education. The Council is not a university, but it has duties very like the regulatory functions of a university faculty, without its powers. And again it is a great advantage to have the regulation of the education leading to registrable qualifications in the hands of the profession. Still further, the work of the Council is mainly the implementation of the Medical Acts. This duty is not a medical but an administrative one, like that of a Civil Service. It is a great advantage that the profession controls itself in this respect, and is not subservient to a branch of the Civil Service. Yet another instance of the value of this professional independence is the *British Pharmacopœia*, which is published under the Council's direction.

There can be little doubt that the medical profession as a whole owes a big debt of gratitude to the General Medical Council, which, reviled, misunderstood, and charged with unpalatable duties, has for a hundred years sustained and improved the whole profession for the service of the public.

Staphylococcal Infection in Maternity Hospitals

IN this issue we print two further accounts of staphylococcal infection in maternity hospitals. The article on p. 1081 by Dr. TIMBURY and her colleagues emphasises again the possible severity and gravity of infections due to a type-80 staphylococcus, and the risk of spread of infection beyond the hospital; and it shows how early closure of the hospital cut short an acute and dangerous episode in which 8 babies were known to have died in six and a half weeks. The article by Dr. GILLESPIE and others on p. 1075 shows that the phage-group-I staphylococci types 52A/79 and 80 caused most sepsis during a period of two and a half years and were most numerous in the nose, but were outnumbered by phage-group-III strains on the umbilicus. In these workers' experience, the disinfection of blankets and garments had no detectable effect on the spread of infection in the hospital; but a moderate improvement followed the use of chlorhexidine ('Hibitane') hand-cream by nurses, and a pronounced improvement followed dusting the umbilicus and the surrounding skin with a powder containing hexachlorophane. Taken together, therefore, the two articles enlarge our understanding of the nature and extent of the staphylococcus problem in maternity hospitals and indicate measures of control which may be applied with hope of success in different circumstances. These articles provide additional arguments to convince us that we cannot continue to tolerate hospital arrangements which turn wards into staphylococcal sewers and some suggestions about how we may make do and mend while the processes of education, including self-education, make their difficult way into unreceptive minds, lay and medical, at all levels of our National Health Service.

Dr. TIMBURY and her colleagues reaped a good harvest from their foresight in beginning phage-typing of staphylococci during a period that was quiet so far as infection was concerned. They were thus able to say exactly when the staphylococcus strain responsible for the acute outbreak entered the hospital, to identify it at once as the notorious type 80, and to warn all concerned of the possible significance of this visitation. In the event the type-80 strain proved highly virulent. This outbreak was marked by a low incidence of nasal carriage of the epidemic strain among the staff, strongly suggesting direct spread from case to case. This would have been favoured by the hospital's overcrowded state, which at the time of the epidemic was even greater than usual. With early closure of the hospital the epidemic strain, which had not yet widely colonised the staff, was eliminated, from the hospital environment. The hospital remained closed for eighteen days—an unwelcome event in all conscience—but thereafter it reopened and remained open without further experience of grave infection, although the usual exchanges of staphylococci and the usual mild infections continued as before. The lesson here is that a dangerous situation must be recognised as early as possible, in the hope of remedying it before the infecting agent has firmly established itself. Routine phage-typing was valuable; but in how many maternity hospitals is it possible to keep watch for the warning that may be clearly given by the sudden appearance of a new type and its association with unusually severe infections? Phage-typing is burdensome and expensive, but not a luxury. In this outbreak it was discovered that in 21 of 99 babies infections developed after they went home from hospital. With 1 exception all these infections were mild, and only 4 were due to a type-80 staphylococcus. The bacteriological evidence of the penicillin-resistance of most of the strains isolated at home clearly indicates how not to treat such infections and points strongly to their being of hospital origin.

There is justice in the allegation that chemotherapy as practised in hospitals is now properly a communal concern. Medical officers of health would be fully justified in regarding this danger to the public health as they would a water-supply polluted by a carrier of typhoid bacilli. If the medical staff of hospitals will not themselves plan how to use antibiotics wisely and safely, they should not complain if others examine what can be done to protect the public from their irresponsible ways. Penicillin, and every other antibiotic, should be given only on medical advice and under medical care and according to a hospital policy agreed by the medical staff among themselves. Hospitals which have not even tried to formulate a policy in this matter have need to be visited and disturbed by the revered ghosts of FLORENCE NIGHTINGALE and LORD LISTER. However much these two may appear to have differed in matters of interpretation, they agreed in seeking to ensure that hospitals should do the sick no harm. We may go further and insist that our hospitals must now desist from menacing healthy members of the general public. How many hospitals and how many patients would lose anything of value if we gave up the casual use of penicillin for, say, two years? If penicillin were given in hospital only to patients who really needed it and were put into strict isolation while receiving it, might not some of the worst results of indiscriminate chemotherapy be eliminated? Truly we cannot be certain of the results, but they could not be worse than the present situation and they might reverse the hopeless drift towards real therapeutic frustration. Some action is clearly needed to restore the value of penicillin—and indeed all the other antibiotics. It is worth noting the evidence of GILLESPIE et al. that resistance to other drugs was almost entirely confined to the penicillin-resistant strains of staphylococci.

GILLESPIE et al. also show the extent and rate of staphylococcal colonisation of infants born in maternity hospitals. Most infants were carriers before they were 2 days old; the umbilicus was usually colonised first and the groin almost as soon. The perineum and some other areas of the infant's skin were sometimes very heavily colonised by staphylococci, and about a quarter of the infants' noses "at risk" acquired staphylococci in each of the first 6 days of life. These facts indicate the abundance of staphylococci available for dissemination

from the infants themselves. The load is there: we must see that it is not carried further than it need be. Unfortunately we are not yet certain at all what should be done to reduce the load and restrict its carriage—though we see plenty that is clearly wrong in hospital architecture, ventilation, and organisation. Meanwhile we have a clear duty to study what can be accomplished by the tactical use of modern antiseptics. Disinfection of bedding and garments, in the experience of GILLESPIE et al., had no detectable effect on staphylococcal exchanges in the hospital or on the incidence of staphylococcal sepsis. Their assessment of the clinical value of the use of chlorhexidine hand-cream by the nursing staff was made difficult by the already low incidence of sepsis; but their findings are encouraging enough to justify the repetition of their inquiry in hospitals where the incidence of sepsis is higher. Their work emphasises the need to control other variables during such trials. The effect of dusting the umbilical area with a powder containing hexachlorophane ('Ster-Zac' baby-powder) was distinctly encouraging. Staphylococcal and other forms of bacterial colonisation of the umbilicus were significantly reduced, and this reduced the subsequent colonisation of other parts of the infant. Dusting the umbilicus with antiseptic powder did not protect the perineum as often as other sites; and the results might have been still better if the powder had been applied to the buttocks and perineum and to other parts of the body as well as to the umbilicus. The results of application of the antiseptic dusting-powder on the incidence of staphylococcal sepsis were certainly promising. In the six months before it was used 19 (5·2%) of the 365 infants in a particular nursery developed staphylococcal lesions of the skin, compared with 6 (2·0%) of 300 in the subsequent five months.

It is reassuring that we are not entirely without means of tackling the existing situation by antiseptics. It is certainly worth re-examining their potentialities in the light of modern improvements in their composition and of our naïve belief that we understand bacteriology well enough to defend our patients from infection by means of what we are pleased to call "asepsis".

Tissue Oxygen and Radiotherapy

OXYGENATED cells and tissues are approximately three times more sensitive to the effects of X rays than they are in the anoxic state.[1 2] With isolated bacterial or tumour cells, the oxygen tension in the surrounding fluid at the time of irradiation can be accurately defined; compared with the anoxic state, very small oxygen tensions (3·5–20 mm. Hg) roughly double radiosensitivity.[3 4] When mice or rats breathe 7% and 5% oxygen in nitrogen (oxygen tensions of 53 and 38 mm. Hg) their resistance to whole-body irradiation is increased as much as twofold [5]; probably in this case the tissue oxygen tensions are reduced to very low levels by metabolism. Most intact tissues probably become fully radiosensitive when the animal breathes air, and further increases of oxygen tension in the respired gas add little to the radiosensitivity. A few normal tissues, such as growing cartilage of growing bones, may normally exist at oxygen tensions low enough to afford some radioresistance.[6] This is probably because dividing cartilage cells are separated from oxygenated capillary blood in the bone-marrow cavity by a layer of actively metabolising maturing cartilage cells 100 μ or more thick.

Most human tumours contain areas of necrosis. On a microscopic scale the distance between capillary blood and necrotic zone has been found to be of the order of 150 μ—the distance at which oxygen might be expected to be totally consumed.[7] If this is correct, then tumour cells adjacent to the necrotic zone must be anoxic and therefore radioresistant to a degree approaching three times that of their well-oxygenated fellows. Thus the usual fractionation of the dose in radiotherapy may "peel off" successive outer layers of well-oxygenated tumour, but there is little evidence that this occurs effectively. The most direct way of overcoming the relative radioresistance of the anoxic tumour cells is by raising the oxygen tension in the respired gas so that more oxygen is carried at a higher oxygen tension in the blood, thereby sufficiently oxygenating all the tumour. Alternatively the surrounding normal tissues could be made anoxic and two or three times the dose of radiation could then be administered. In this way the effective dose to normal and oxygenated tumour cells would remain unaltered but the anoxic tumour cells would receive a much larger effective dose.

The very great difficulties of irradiation while the patient breathes oxygen at 3–4 atmospheres pressure have been admirably overcome by CHURCHILL-DAVIDSON and his colleagues.[7] Their results are encouraging, but the technique of giving only two or three applications of X rays does not enable the effect of oxygen in the new treatment to be appraised against the background of past results, and final judgment will depend on the accumulation of sufficient control cases. The alternative method of inducing anoxia in normal tissues and giving a proportionately higher dose of radiation is theoretically equally effective and might be more practicable. Anoxia develops in organs rapidly if blood is excluded. For example, cat muscle became anoxic seven to twelve seconds after its blood-supply was cut off,[8] and the bones of the growing mouse tail became fully radioresistant four seconds after compression.[9] Anoxia can be produced in this way in limbs; and radiotherapy under these conditions could be given a trial using conventional therapy sets. Unfortunately most human tumours are not peripheral; and a method of whole-body anoxia which will protect normal tissues has been sought. Anæsthetised mice given pure nitrogen to breathe became two and a half times as resistant to the effects

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of very rapid whole-body electron irradiation in less than thirty seconds, and the thymus glands of young mice became three times as radioresistant after ten to twenty seconds of nitrogen breathing.[10] No ill effects were observed after this brief anoxic period. Much more work must be done before this dramatic and possibly hazardous technique can be considered for therapy, but linear accelerators capable of delivering thousands of rads per second already exist.

Yet another possibility of producing radioresistance in normal tissues has been raised by the work of EBERT and his colleagues,[11 12] who found that high pressure of inert gases abolish the radiosensitising effects of oxygen on bean roots and Ehrlich ascites tumour cells, even when the oxygen tension is not changed. They made the even more interesting observation that when Ehrlich ascites tumour cells were exposed to an atmosphere of 80% nitrous oxide and 20% oxygen the radiosensitising effect of oxygen was completely removed. But no radio-protection has been observed with high pressure of argon or mixtures of 80% nitrous oxide and 20% oxygen when intact mice or their intact tissues were used as the test object.[13]

One serious handicap has been that there is no reliable and convenient method of measuring oxygen tension in tissues. Considerable doubt exists as to the quantitative validity of measurements made with needle electrodes by polarographic methods, but in animals and man changes in normal and tumour tissue have been found in association with changes in the oxygen content of the respired gas.[14]

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Annotations

CHILD PSYCHIATRY

Dr. Leo Kanner, director of the children's psychiatric service at Johns Hopkins Hospital, who can fairly be described as the doyen of child psychiatrists, delivered the Maudsley lecture of the Royal Medico-Psychological Association in London on Nov. 13.

The new specialty of child psychiatry resulted, he said, from the fusion of a number of other disciplines. The great forerunner was, of course, psychiatry itself, and 19th-century writers, including Henry Maudsley, devoted a good deal of attention to mental disorders in children—a contrast to the early part of this century when these manifestations were denied. It was, said Dr. Kanner, a matter for regret that the classification of psychosis in children is still about as conjectural now as when Maudsley first put forward his seven-point scheme in 1860. Usually, however, such psychosis was divided, as in adults, according to whether the child did or did not show intellectual deficit. Emphasis in those days was on the internal immutable aspects, and ideas on heredity and degeneracy led to a somewhat fatalistic view. In 1866 the apparently homogeneous group of mental defectives was first broken by Langdon-Down's description of mongolism, and this gave an impetus that led to the emergence of the new science. This important work was carried on too much apart from the main stream of psychiatry.

Next to make systematic observations of the child were the great educationists, among whom, in the late 18th century, the French were outstanding. The breadth of knowledge gained by those attempting remedial methods with backward children was remarkable. Criminology was third in line, and in the 1890s the retaliatory and punitive attitude was for the first time seriously attacked. South Australia and Illinois had the distinction of being first with juvenile courts, and these became established throughout the world. They were conducted usually by a jurist with the help of social workers, psychologists, and psychiatrists. Healey, Eichhorn, and the Gluecks among others were intimately concerned with this field, and their contribution to child psychiatry was great. At the turn of the century the psychologists turned from armchair theorising to contact with real people, and Binet initiated the careful study of certain areas of function with the important results so well known today. Psychoanalysis, of course, had made an enormous impact, and Dr. Kanner contrasted the almost religious observance of the word of Freud extant in some places today with his own extreme caution and hesitancy in his original writings on infantile sexuality. This vital work was written from the reminiscences of a small number of adults, three years before Freud started seeing children. The awe-inspiring genius of the man could not be doubted, nor his honest doubt about his theories; and, however much one wished for firmer foundations, his daughter Anna Freud had shown how useful the psychoanalytic approach could be in understanding and treating disturbed children. Finally in the genesis of child psychiatry came the child-guidance clinics, which were founded by Clifford Beers in the 1920s. Here the greatest contribution was the departure from the one-sided "internal" aspect of the child to the study, instead, of the things that the external world was doing to it. By examination of interpersonal relationships and environmental factors they could help the child by modifying the attitudes of parents and teachers towards it. Furthermore "release" therapy enabled the child to bring his emotions to the surface and deal with them. The usual team of psychiatrist, psychologist, and social worker had become too rigid over the years, so that other disciplines had become excluded.

Although these groups remained isolated, there were fortunately some men of vision, and August Homburger merited the title of the original child psychiatrist. In 1917 he set up the first department of this specialty at the University of Heidelberg, and his distinguished career ended there with his death in 1930 at the age of 57. Among other notable innovations was a course of lectures on psychotherapy at a time when psychodynamics played no part whatever in orthodox medicine and psychiatry. He realised that cerebral anomalies could not account for all features of childhood behaviour, and he founded the present approach to the psychopathology of childhood.

Pædiatrics had developed somewhat apart. There was an atmosphere of suspicion, and even of open hostility, on both sides. The psychiatrists in particular, of those days were too sweepingly dogmatic and aggressive. It was abundantly clear, however, from the work of Hector Cameron and others that some pædiatricians were alive

to the subject, and the descriptions of the hospitalised deprived child drawn by Goldfarb, Spitz, and Bowlby were anticipated by them. Dr. Kanner believed that he himself was the first " pseudopodium reaching out from the psychiatric amœba " when in 1930 he started his work in the midst of an ordinary pædiatric outpatient clinic. There was an excellent tendency, nowadays, towards synthesis between these spheres; but certainly there was no uniformity yet, and Dr. Kanner thought this to be right and proper. He sounded a powerful warning against rigidity and dogma in theory and treatment. The necessity to study the patient and understand him as an individual had been constantly emphasised since Maudsley wrote so trenchantly on this topic in 1895. Diagnostic clarity certainly remained desirable, and the work started by Kraepelin was nowhere so important as in child psychiatry; but each child remained unique, and theories should be fitted to him, not the child to the theories. Where organ pathology was ignored and dynamic factors were regarded as the sole determinants, theory and method gained ascendancy over the patient and the door was opened to treatment by laymen with or without a psychology degree. This invasion by lay psychotherapists was evidently not applauded by Dr. Kanner. Another aspect of anarchy creeping in was the concept of the " atypical " child. He regretted this tendency to return to pre-Kraepelinian diagnostic looseness, and the consequence of it all was to " put the therapeutic cart before the diagnostic horse, or even to throw the horse away altogether ". Play therapy was but one part of the doctor's responsibility, and there was ample room for help from without (i.e., manipulation of the environment) after careful evaluation of every aspect of the case. Such an approach clearly owed much to the late Adolf Meyer.

In conclusion, Dr. Kanner declared that, although child psychiatry was still a relative newcomer, the time had definitely come for a sober evaluation of results, and there was a need to examine the " free-floating generalisations ". Thereafter further generalisations could be made and in turn submitted to study. " Reality-testing " was what the specialty needed at the present time. It is easy to say " amen " to that.

RENAL FUNCTION AND INTERNAL DIAMETER OF RENAL ARTERY

It is well known that in some disorders of the kidney associated with diminished function, the effective blood-flow through the organ may be much reduced. There are some grounds for believing that primary changes in the renal parenchyma causing relative ischæmia may often be followed in due course by intimal proliferation in the main renal artery with consequent reduction of its calibre. The sangfroid of some surgeons on accidental avulsion of the renal pedicle during difficult nephrectomy may possibly be connected with intuitive appreciation of this feature — though it is by no means to be depended on.

Maluf [1] has shown that significant reduction in the internal calibre of the main renal vessels is a constant feature in renal hypoplasia, polycystic disease, and some varieties of hydronephrosis. The renal artery was measured by its apparent diameter in the X-ray film, with correction for the magnifying effect due to distance. As a further check the size of the renal vessels was compared with that of an adjacent artery, such as the splenic. This check may be especially advisable since in cases of compensatory renal hypertrophy due to contralateral disease the diameter of the main artery on the healthy side is often increased, and this may lead to misinterpretation. Maluf claims that assessment of the actual and relative sizes of the renal vessels, in conjunction with the ensuing nephrogram, gives a guide to renal function which may prove of value in determining the scope of surgery in bilateral renal disease.

1. Maluf, N. S. R. *Surg. Gynec. Obstet.* 1958, **107**, 415.

CULTIVATION OF THE LEPROSY BACILLUS

Hansen's recognition, in 1868, of *Mycobacterium lepræ* as the causal organism of leprosy has never seriously been challenged. Nevertheless we know today very little more about the leprosy bacillus than did the early bacteriologists who first observed it. Repeated claims have been made to have cultivated the organism outside the body, but continued multiplication in laboratory media has never been reliably confirmed.[1]

The rat leprosy bacillus, *Mycobacterium lepræmurium*, resembles the human leprosy bacillus in several ways. It causes a disease in rats not unlike the human disease; the organisms are found in very large numbers inside monocytes; and it has never reliably been maintained in laboratory culture-media. Recently several groups of workers have reported significant though limited multiplication of *Myco. lepræmurium* in cultures of spleen tissue or cells [2 3] and also in cultures of rat monocytes.[4] In some of these experiments the bacilli multiplied if hydrocortisone was added, but none of the systems used has been really satisfactory. Garbutt, Rees, and Barr,[5] using a strain of rat fibroblast cells without hydrocortisone, now claim to have obtained convincing evidence of multiplication of bacilli up to five times the number inoculated.

Cultures of rat fibroblasts growing in a special medium were infected with partly purified suspensions of *Myco. lepræmurium* prepared from the livers of infected mice. Most of the fibroblasts ingested several bacilli, and the infected cells were incubated in medium which was changed every 11 days. To count the number of bacilli present it was necessary to release completely the bacilli from the cells. This was done by exposing the culture tubes to ultrasonic vibration for 15 seconds—a procedure which disrupted the cells without damaging the bacilli. Smears were then made from the disrupted cells and stained by Ziehl-Neelsen's method. In this way it was possible to obtain counts of the numbers of bacilli in the cultures at the start and during incubation after 13, 26, or 39 days. In most experiments the culture tubes were divided into two groups: (*a*) those without antileprous drugs, and (*b*) those with the addition of 100 μg. streptomycin and 0·1 μg. isoniazid—a combination expected to inhibit growth of organisms in vitro, in view of its known effectiveness in infected animals.

The results were encouraging. In the presence of the drugs *Myco. lepræmurium* did not multiply at all; in their absence multiplication occurred in eight out of nine experiments. In three of these experiments multiplication continued over the whole period of 39 days, and the bacterial population increased to between three and five

1. Wilson, G. S., Miles, A. A. Topley and Wilson's Principles of Bacteriology and Immunity. London, 1955.
2. Rees, R. J. W., Wong, P. C. *Nature, Lond.* 1958, **181**, 359.
3. Wallace, J. H., Elek, S. D., Hanks, J. H. *Proc. Soc. exp. Biol., N.Y.* 1958, **97**, 101.
4. Hawking, F. *Leprosy Rev.* 1958, **29**, 71.
5. Garbutt, E. W., Rees, R. J. W., Barr, Y. M. *Lancet*, July 19, 1958, p. 127.

times the number originally inoculated. In other experiments, however, multiplication was restricted to the first period of 13 days.

If these results can be repeated on a larger scale, they represent a real step forward. Since the amount of multiplication varied considerably between different experiments it is natural to wonder how much of it can be put down to errors in counting. The experimental error of the method used might well be considerable, but Rees and his colleagues have taken great care to reduce this as much as possible; each mean count of acid-fast bacilli was obtained from a pool of three cultures from which two or four spreads were made and each counted in duplicate. The fact that in the presence of the drugs the number of bacilli did not change significantly seems to provide a valid control of the method.

It is a far cry from rat leprosy to the disease in man; but if, as Rees and his colleagues say, they have produced " for the first time, a reasonable system in which to study the conditions required for continuous multiplication ", then similar methods may prove rewarding in the attack on the human leprosy bacillus.

WOUND INFECTION

Prof. Rocke Robertson, of Vancouver, has reported in a Moynihan lecture [1] an accurate record of postoperative wound infections in a general surgical ward of 65 beds during two and a half years. In 1917 cases there were 178 infections (9·3%), of which 46 (2·4%) were clinically significant. A simple comparison of these figures with those published by others is not particularly useful. As Robertson emphasises, the conditions and material of different surgical units differ so widely that the figures are not truly comparable; and workers who publish figures generally do so because they are not satisfied with their methods and results. Those who try to improve things in hospitals will be glad to quote Robertson's authoritative opinion that " all who have searched for trouble have found it ". Summarising measures that might be adopted in hospital for the control of infection, he lists the following for consideration:

(1) Provision of an isolation ward; (2) removal from all contact with patients of any members of the hospital staff who have active infections; (3) laundering of blankets and provision of a clean set for each patient; (4) autoclaving of mattresses or provision of a mattress-cover of washable or plastic material, a fresh one for each new patient; (5) laundering of a fresh set of pillows for each patient; (6) separation of clean from dirty laundry both in the laundry itself and in respect of the containers used to transport the materials to and from the laundry; (7) the abandonment of dry methods for dusting, sweeping, and floor-cleaning in parts of the hospital where patients are exposed; (8) systematic decontamination of baths and toilet seats; (9) an increase and improvement of washing facilities; (10) better preoperative preparation of the area of the impending surgical wound; (11) decontamination of anæsthetic apparatus; (12) a check on ventilators and ventilation; (13) a check on all procedures alleged to sterilise materials; (14) the wearing of impervious aprons by the surgeon and his assistants; (15) impervious drapes for the wound; (16) irrigation of wounds with saline solution; (17) the use of antiseptic dressings around drainage tubes; and (18) a no-touch dressing technique.

The unfortunate thing is that we do not know enough yet to be dogmatic about which of these measures may be useful or necessary, though none of them is without point. Moreover, the nuisance and cost of some of these measures make them unpopular, especially among those who believe that they have no trouble—a belief that often rests partly on a systematic avoidance of any objective record of wound infections and partly on a misguidedly loyal practice of ward sisters who believe that some things should not be disclosed to " The Chief ": they would only upset him. Professor Robertson's lecture should be studied by all surgeons and hospital administrators—especially those who believe that the problem of wound infection has been exaggerated, or that it troubles various colleagues for obvious reasons but not their own units, or that it cannot be prevented and so had better not be fussed over. Sepsis is most likely to be serious in units where its possible presence or importance are minimised and obvious measures of prevention are ignored because they would be a change or would imply that all is not already perfect.

Robertson freely admits that Lord Moynihan would probably have had little patience with many of the proposals. Isolation he would almost certainly have regarded as superfluous; but against that he would have approved practices which owed their origin to Lister's concentration on care for the protection of the wound. The so-called aseptic ritual of today may be named with sinister appropriateness; for very often it is much more of a rite practised by the faithful but ignorant than an effective process carried through by persons with an informed understanding. If we will not insist on clean air, effective sterilisers, and real theatre discipline, we had better reinforce our ritual with an intelligent use of modern antiseptics to protect the wound area and decontaminate many of its doubtful contacts.

Evidence of the need for effective action is never far away. Burnett, McDonald, and Timbury [2] report that 16 clean operation wounds became clinically infected in a series of 211—an infection-rate of 7·6%, which is similar to the 9·8% for serious infection recorded by Jeffrey and Sklaroff.[3] Barber and Dutton [4] described two hospital outbreaks of staphylococcal infection, each due to the admission of a patient with superficial infection. Nor can we rely on antibiotics to get us out of trouble. For example, Magovern and Blades [5] show that the treatment of staphylococcus empyema is a skilled surgical procedure requiring in effect complete evacuation of an abscess. In the treatment of this condition, antibiotics must be used with " pinpoint accuracy "; otherwise the patient, chronically ill, will harbour an organism resistant to all the usual antibiotics. It may be added that the possibility of such situations will be particularly great if the need for effective isolation is ignored and the patient with the tube in his chest inadvertently lies in the next bed to a man with an extensive wound partly covered by a skin graft but still freely discharging antibiotic-resistant staphylococci—a situation not conjured up from the imagination. Indeed, so far as antibiotics are concerned, we should take note of the continuing appearance of reports of the increasing resistance to antibiotics observed among microorganisms isolated in general hospitals. Weil [6] found that neomycin and chloramphenicol offered the widest coverage in multiple infections. Both these valuable drugs have to be used carefully—especially with a responsible awareness of the dangers of exceeding the dosage advised by their makers.

1. Robertson, H. R. *Ann. R. Coll. Surg. Engl.* 1958, **23**, 141.
2. Burnett, W., McDonald, S., Timbury, M. C. *Scot. med. J.* 1958, **3**, 392.
3. Jeffrey, J. S., Sklaroff, S. A. *Lancet*, 1958, i, 365.
4. Barber, M., Dutton, A. A. C. *ibid.* July 12, 1958, p. 64.
5. Magovern, G. J., Blades, B. *J. Amer. med. Ass.* 1958, **168**, 365.
6. Weil, A. J. *N.Y. St. J. Med.* 1958, **58**, 3102.

Conferences

FILLING MEDICAL APPOINTMENTS OVERSEAS

A B.M.A. Conference

MANY countries overseas urgently need doctors from Britain. They need them for medical schools, research institutes, hospitals, public-health projects, and medical services during the transition period before there are local doctors fitted by training and experience to take over. But recruitment of British doctors to such posts is impeded by fears (1) that their career overseas may be prematurely terminated by political developments and (2) that when they come home again they may find it very hard to get congenial medical work. Believing these fears to be "by no means groundless", the British Medical Association held an informal conference in London on Nov. 14 to consider some of the remedies that have been proposed. Prof. A. P. THOMSON, president of the Association, took the chair.

Two separate problems emerged. The conference began by considering ways in which more security might be given to doctors choosing an overseas career (particularly in the Colonial Medical Service) and later turned to suggestions which might make it easier for doctors in British hospitals and universities to go abroad for a few years.

THE OVERSEAS CAREER

Prof. D. E. C. MEKIE, chairman of the B.M.A.'s Overseas Committee, explained how the situation has changed: on the one hand, a career abroad may now be ended abruptly for political reasons, and on the other hand the National Health Service has made it difficult for returning doctors to take up private practice. Prof. GEORGE MACDONALD (Ross Institute), though not much impressed by the risk of doctors losing their jobs (except in India, he had not heard of contracts being terminated), pointed out that in independent countries the British have little chance of gaining senior administrative posts, and their only opening for promotion may be to become specialists. Dr. IAN GRANT (College of General Practitioners) had found anxiety greatest among the general-duty officers, who, though they are usually doing general practice at a high level, are unlikely, when they return to Britain on their very small pension, to secure N.H.S. practices against the competition of younger men who have stayed here and know the ropes. Air Marshal Sir JAMES KILPATRICK (London School of Hygiene) said that for work whole-time overseas people require both reasonable security and opportunities of refreshing their knowledge. The alternative is to divide the work between service abroad and service at home in a parent organisation, as is done in the Forces. Mr. J. L. GILKS made it clear that the rank-and-file medical officer, who is the backbone of the Colonial services, used to be secure but now is not.

The first proposals put before the conference were all intended to give the overseas doctor a safe base in this country.

> 1. That a British Overseas Service should be created, managed and remunerated by the United Kingdom Government, in which a full career would be to all intents and purposes guaranteed.

Sir CHARLES JEFFRIES (formerly Colonial Office) thought that, given the will, a service operated from this country is possible; and, provided it has Government support, it need not necessarily be operated by the Government. A London centre for teaching and research in tropical diseases could be the administrative base for overseas work, affording medical employment for doctors who come and go.

> 2. That a Commonwealth Service should be created, managed, and remunerated by a consortium of Commonwealth Governments, in which a full career would be provided.

Mr. BERNARD BRAINE, M.P., said that the need overseas for administrative and specialist personnel of all kinds is growing. To fill that need is the only way to make the multiracial Commonwealth a reality, and the creation of a new service for the purpose would strengthen and inspire the Commonwealth family. But there are difficulties. First, the expatriate must be the servant of the country which employs him: there must be no doubt about where his loyalty lies. And secondly, the Commonwealth Governments, all of whom are short of highly qualified personnel, seem unlikely to be interested in running Territories for which they are not responsible. Mr. Braine saw no valid reason why the pay and pensions of doctors working in the various Territories should not be underwritten by the British Government: indeed these doctors could be called members of a Commonwealth service. But he had become cautious in thinking that a Commonwealth solution is practicable, and so far as medicine is concerned he doubted whether it is necessary. The Colonial Office, he said, does not at present seem to have any special difficulty in filling the vacancies (about 130) it advertises every year.

> 3. That the medical branch of H.M. Overseas Civil Service should be merged or linked with the medical branch of the Home Civil Service, so that doctors relinquishing overseas appointments could be absorbed into the medical establishments of home departments.

Dr. E. GREY-TURNER (B.M.A.) explained that the Civil Service recruits about 30 doctors annually, and about half of its 550 medical appointments are mainly clinical. In the Colonial Service about 95% of doctors are doing purely clinical work; but among about 600 doctors recruited in the United Kingdom the average normal number of retirements is only about 15. Though the Civil Service clinical work is less in quantity and scope, and might not attract displaced clinicians from overseas, they might prefer any clinical appointment to none at all, and it would be a comfort to them to know that they can always have a Home Civil Service appointment, even if in fact they choose something else. Dr. Grey-Turner held that actually it would be very difficult if not impossible to integrate the Civil Services of 35 separate Territories with our own; but he thought more use could be made of the special list, by which doctors can be employed by the British Government and seconded for work abroad. In case anyone should wonder why the Government does not promise the returned doctor work in the National Health Service, he pointed out that in such matters the Government are not in a position to give instructions to the boards.

Sir JOHN CHARLES (Ministry of Health) made it clear that, though about 550 doctors work for Government departments, there is no single medical service. He regarded the opportunities for returning doctors to do clinical work in the Civil Service as "a bit limited"; for example, to become a regional medical officer, of whom

there are 60–70 in the Ministry of Health, at least eight or ten years' experience of general practice in this country is thought desirable. The Ministry's administrative staff, on the other hand, contains 10 doctors returned from abroad.

SECONDMENT FROM THE N.H.S.?

Speaking on the proposal

> 4. That the medical branch of the Overseas Civil Service should be linked in some way with the National Health Service,

Prof. ALAN MONCRIEFF (London University) recalled Mr. H. J. Seddon's plan whereby the overseas service was to become part of the N.H.S.[1] But he spoke mainly on the need for doctors to be seconded overseas from British hospitals and universities. No scheme will succeed, he said, unless the hospital boards and their medical advisers appreciate the importance of our doctors working abroad: at present, in Seddon's words, " they know little and care less "; and they must be persuaded both by official memoranda and by personal visits if need be. Secondments so far have been very few, though proportionately more in Scotland: one consultant who asked to go abroad for two years got no encouragement from his board and no help over locums; and senior men are apt to sneer at such " missionary " activities. At university level there is more support for secondment; but to get it to work at Great Ormond Street a " priming " expenditure of £4000, from endowment funds, was needed in the first year. Secondment can mainly cover the supply of specialists—at present the main problem—and it need cost the regional boards nothing. Appointments could be made by a body on the lines of the Inter University Council. The best stage for going is usually that of senior registrar; the post can be regarded as a continuation of training, and if the man has children they will probably be young enough not to need education in this country. We must hammer at the boards, said Professor Moncrieff.

Mr. E. F. COLLINGWOOD (Newcastle regional board) said that boards do not prevent men going; they are very willing to consider secondment provided they do not have to finance it, which is right outside their responsibility. But it is hard enough to get senior registrars to move from a teaching hospital to a regional one, and to move them to another country would be harder. The reason may not be unwillingness, or lack of money incentive, but purely domestic.

Mr. N. M. AGNEW (Manchester regional board) doubted whether the senior registrar is the right man to go. Often he is one of a team, to which he may not get back. If anybody goes, it should be the consultant, taking the registrar with him. As for the difficulty of getting back, after losing " a place on the ladder ", appointments are made, in effect, by advisory committees which are mostly medical. For a board to suggest to its advisory committee that a particular man should be appointed would be most dangerous. If anybody needs educating about this it is not the boards but the medical profession.

Prof. A. BROWN (Ibadan) agreed with Professor Moncrieff that secondment is probably the best solution. He talked in terms of secondment for a year—a short time during which a man can be expected to take the risk of losing an advertised appointment. But there must be no humbug; on arrival he must not find himself expected to buy crockery for his house. Moreover, to avoid explaining over and over again, the scheme should be widely known. Overseas service should be regarded as creditable, not as a rather unfortunate lapse.

Dr. B. E. C. HOPWOOD (B.M.A., Uganda) hoped that temporary secondment of doctors from this country will not prejudice promotion for men making their career abroad.

Prof. J. H. F. BROTHERSTON (Edinburgh) said that for a postgraduate school it is an advantage to have teachers who know conditions in the countries from which the postgraduates come. Direct relations between two universities make it possible to build up know-how on both sides, which helps in quick adjustment of those seconded. Perhaps, however, single British universities have not all the resources needed by a college overseas. Should such a college perhaps be attached to a consortium of universities? The Montreal inter-university conference resolved on more interchange between Commonwealth universities, which in some ways, being non-political, is preferable to interchange between Governments.

PROLEPTIC APPOINTMENT

Prof. CHARLES WELLS (Royal College of Surgeons) thought secondment satisfactory for consultants, and perhaps for younger men in limited fields, such as pædiatrics, where their seniors can make sure that they get credit for work abroad. But in general medicine or surgery this is impossible, and anyone seconded runs a grave risk of losing his place on the ladder. On this ladder the vital step is appointment as consultant, and until this is passed the young doctor dare not move away. So it is that, though there is a large superabundance of suitable people here, who are much needed abroad, they cannot go. To meet the situation he proposed:

> 5. That consultant appointments in the N.H.S. should normally be made two years ahead of the vacancies arising. Thus a group of consultants-designate would be created who could be encouraged to take service abroad for the period which would then elapse before they assumed their appointments in the N.H.S.

For the first time since he became a medical student, the man thus appointed would be free to adventure—perhaps taking a post abroad. But if he did not want to do so, he could spend his two years very usefully as locum for consultants. The scheme would cost nothing, for the person appointed would not be paid till he was employed. Nor would it need any organisation. But it would give a chance for the natural operation of the law of supply and demand; for, until they know that they can get somebody, the schools and hospitals abroad are unlikely to ask. The Ministry of Health could put the plan into action at once by a simple instruction to boards—not educating them but *telling* them.

Mr. E. R. EDMONDS (Colonial Office) described this proposal as very attractive. But in the Colonial service selection of directors of medical services two years ahead has proved impossible: " you don't know what the field will be ". He thought that an insuperable difficulty. Commenting on this later, Prof. IAN AIRD (Postgraduate Medical School) pointed out that, though one may miss a good man by appointing too early, one may also miss a good man by appointing too late. In point of fact, the successful applicant for an appointment is often known more than two years in advance.

Mr. G. I. CRAWFORD (Ministry of Health) asked whether it would be fair to competitors to close certain

1. Seddon, H. J. *Lancet*, 1956, i, 46

openings before they exist. He was clear that proleptic appointments, as proposed by Professor Wells, are beyond the scope of the legal instruments.

Mr. ROGER BREARLEY (Registrars' Group, B.M.A.) thought that this obstacle could be surmounted by making new regulations, which would distinguish between being appointed to a post and actually holding one. Professor Wells' scheme has the great merit, he said, of being based on freedom—not on pushing people around. Those in training for a specialty feel confined—like sheep going through a narrowing pen to be dipped. The proleptic appointment offers a man two years' freedom to get outside the hurdles and do what he wants—to vegetate or to mature. Moreover, if appointments are hastened by two years, some of the registrars now overdue for senior-registrar posts can be appointed. He thought that a non-official agency should be established—possibly by one of the philanthropic trusts—to put available people in touch with those who need them. Such a body, declaring that it is now in the market for doctors, would pay them salaries and arrange for them to work where they are wanted.

SUPERNUMERARY POSTS

PROF. K. R. HILL (Royal Free Hospital) proposed:

> 6. That supernumerary appointments should be created on the staffs of universities and hospitals in the United Kingdom and that the holders of these appointments should be seconded to universities and appointments overseas.

Universities in the Colonies, he had found, favour secondment and exchange, especially at registrar level. Heads of departments here have been responsive but have said: "I haven't got the staff to spare, and I haven't got the money." To meet this situation and enable young doctors to come to this country without interfering with the work of its hospital, Ibadan might appoint several supernumerary registrars; and a plan could be devised for joint appointments by the Royal Free Hospital pathology department and Ibadan, which guarantee the holder a year or two in his home department when he came back from secondment to West Africa. To provide four supernumerary registrars for each of six overseas colleges would cost perhaps £56,000 a year: allowing for payment by some of the colleges, Professor Hill reckoned the net expense to this country at rather over £30,000—a modest sum in relation to the value of the scheme both to the colleges and to British medicine.

Discussing this plan, Mr. BREARLEY deprecated the appointment of supernumerary registrars on the ground that there are already too many people in the penultimate stage. Professor AIRD thought it might be very suitable for preclinical departments and possibly for clinicians too.

REMOVAL OF HANDICAPS

Professor Hill also made three other proposals.

> 7. That, for consultants appointed to the N.H.S., service overseas of recognised standing should count in its entirety towards seniority, and the limit of four years' seniority which can be granted at present should be removed.
>
> 8. That selection boards for appointments in the N.H.S. should not ignore a candidate merely because he is stationed overseas, but should short-list him if his qualities are sufficiently worthy and should pay his travel expenses to and from the United Kingdom in order to interview him.

The knowledge that candidates abroad are liable to be called for interview would, in Professor Hill's view, give a boost to morale. Expenditure of perhaps £300 on air fares should be weighed against expenditure on the future consultant's salary—possibly £60,000 to £100,000.

Prof. H. W. RODGERS (Belfast) agreed that this would do a great deal of good; but Dr. E. R. BOLAND (Guy's Hospital) thought that, with applications from perhaps 30 candidates, of whom at least 10 would be excellent for the post, a board could hardly be expected to pay for someone to come from abroad. There would have to be a fund for the purpose.

> 9. That universities and employing authorities in the N.H.S. should advertise senior appointments at least three or four months in advance of the closing dates in order that overseas candidates might have a full opportunity of applying for such posts.

Professor Hill spoke of protests from Hong Kong about the shortness of the notice given. Perhaps two months would do. For 23 N.H.S. posts advertised in the previous week the average was 24 days, and one teaching hospital gave a date only 9 days ahead.

MONEY

Prof. MELVILLE ARNOTT (Birmingham) had no doubt of the immense value of arranging that doctors at all levels are able to spend time overseas. But water will not run uphill, and they will not go to their own disadvantage. A fund must be created to enable them to go without loss. For an established consultant (without merit award) at least £3000–£3300 is required, plus an adequate disturbance allowance. Sir JAMES KILPATRICK also emphasised that a scheme of secondment requires solid financial backing—with allowances for education of children, for example.

Dr. BOLAND thought that most of the problems are soluble by money. The staff of some of the colleges overseas, he said, are grossly underpaid by English standards.

Professor BROWN explained that Ibadan salary scales are almost identical with those in English universities; but doctors in West Africa may have to send their children to boarding-schools in this country, at perhaps £400 each; and this may oblige them to leave. Some have been asked to pay income-tax in both countries because they have a cottage here. Pensions are inadequate, and the academic staff have no parent organisation to help them, as missionaries have. A different salary structure should be devised, so that a valuable lecturer, unable to get promotion in a small school, will nevertheless reach a reasonable competence.

Professor Brown also mentioned the need to give good opportunities to investigators from this country who might want to do part of their research abroad, where medical facilities are in fact much better than is generally supposed. Professor RODGERS, disagreeing with Professor Arnott that water always flows downhill, said that people will not go abroad for more security; but they *will* go because they get a chance to do work they think themselves capable of doing, but cannot do here, or because they want to do research—though not necessarily research alone.

Professor BROTHERSTON pointed out that colleges overseas cannot be expected to pay men from Britain more than they pay their own staff, and it would be easier if visitors were supported from home. But he was not sure that money is the greatest difficulty: perhaps it could be found through the Colombo Plan. The real difficulty is to get the right people to go. But "we mustn't," he added, "express our benevolence at the expense of young men who haven't been at our conference". A man should go abroad not because his seniors know that it will make him

a better man but because he himself sees that it would be advantageous. The moment it is found that posts are more likely to be given to someone who has been abroad, the demand for secondment may be overwhelming.

Speaking of the doctors who want to make their career overseas, Professor MACDONALD said that the material advantages of doing so are now nothing like what they were. When he went abroad the commencing salary in West Africa was £600; today it has not doubled, and there is income-tax to pay on it.

THE SITUATION

Professor AIRD could not see how general-duty medical officers returning from Colonial services can fit in anywhere at any level in our medical service here. These people, Dr. HOPWOOD said, are not concerned with losing their place on a ladder but with getting any job at all; and Dr. JOHN REVANS declared that the conference had suggested nothing for them. Professor THOMSON agreed that there had been no concrete proposal: but the security of these doctors, he said, is a Government responsibility, and the profession, as organised, can do little to help. Putting this in another way, Dr. GRANT had pointed out that, if men are expected to go and work in the Colonial service, arrangements must be made for when they come back.

On the academic side, Professor BROWN saw the problem as self-limiting, because the appointments will in due course be filled by local people. At Ibadan it will be solved as regards registrars in five years and as regards more senior men in ten. ("How very convenient," remarked Mr. BREARLEY, since the senior-registrar problem, too, will sort itself out in five to eight years' time, and meanwhile the one need fits the other.) Till then, said Professor BROWN, "the situation remains plastic".

Professor THOMSON, in his concluding remarks, said that, though five or ten years may be true of the Ibadan college, it cannot apply generally to the vast territories even of Nigeria. The overseas colleges have to train not only doctors but also technologists and technicians. Singapore said that, however much it stepped up its teaching, it must for a generation rely partly on staff from outside. As to the ways in which doctors can be enabled to go abroad for a time, Professor Thomson was astonished by the passion for uniformity which the conference revealed: "everybody wants a uniform scheme". (For thirty years Birmingham, by means of a private fund, has been making proleptic appointments, so that the successful candidate can have a year abroad. Why always two years? Why not sometimes three?) He believed that Commonwealth universities may be more helpful than Commonwealth Governments, and he recalled the offer of McGill University to adopt the University College of the West Indies. He felt that the relations of the overseas colleges have been a little too closely with London: it would be better if each of them were linked with two or three universities here, which would feel a special responsibility for them.

The most significant thing said at the conference, in Professor Thomson's opinion, was Professor Brown's remark that the state of medicine in these overseas countries is now plastic but will soon set. He was certain that, unless the opportunity is taken now, the influence moulding them will not be British. "We've got to do much more", said Mr. JOHN TILNEY, M.P., "if this country is to survive as a motherland country in the Commonwealth."

Special Articles

AN INJECTION UNIT USED INSTEAD OF THE HYPODERMIC SYRINGE

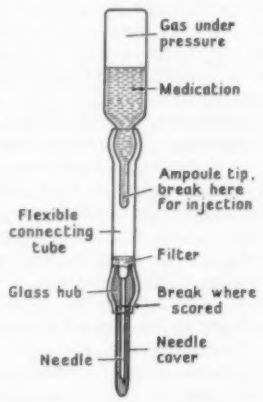
CHARLES M. FLOOD
M.D. Lond., M.R.C.O.G.

CONSULTANT OBSTETRICIAN, THE WEIR MATERNITY HOSPITAL; HON. ASSISTANT OBSTETRICIAN AND GYNÆCOLOGIST, HOSPITAL OF ST. JOHN AND ST. ELIZABETH, LONDON, N.W.8

ADVANCES in the discovery and development of drugs have far outstripped advances in the methods of their administration. In the 1947 revision of the *U.S. Pharmacopeia* 17% of the items were for parenteral injection, compared with less than 2% in 1905; and the use of hypodermic syringes is now so widespread as to be taken for granted. Yet these syringes have some evident disadvantages. To be safe and efficient they must come from a central syringe service with a skilled staff, who will service and sterilise each syringe and needle after each injection: only in this way can infective hepatitis—so common with syringes "sterilised" on the ward or in the operating-theatre—be reduced to a minimum. But a syringe service is costly. Moreover, it has been ascertained that the average life of a syringe and of a needle is respectively 73 and 45 injections before replacement is necessary through damage or wear.

DISPOSABLE INJECTION UNIT

An alternative means of injection, devised some years ago, is marketed under the name of 'Ampin'. It is a sterile disposable injection unit, with its own needle, attached to an ampoule containing the drug (see figure).



1. The *ampoule* is of glass, with a long thin neck, and contains the drug solution and an inert gas. In manufacture, after the solution has been inserted, the ampoule is pressurised at 2 atmospheres and sealed. The volume of the ampoule is always twice the volume of the solution. Hence, with an initial pressure of 2 atmospheres, no surplus pressure remains in the ampoule after the solution has been ejected. The inert gas used is nitrogen, argon, or sterile air, depending on the nature of the drug solution.

2. The *needle unit* is made up of the cannula, the filter, and the glass needle-cover. The cannula is made of stainless steel of exactly the same quality as is used in an ordinary hypodermic or intramuscular needle; but, instead of being mounted in a metal hub, it is mounted in glass. The needle cover is scored so that it can be easily snapped off, exposing the needle ready for use. The filter is made of very fine balloon fabric, or (if the solution is viscous) of very fine gauze. It is there for two reasons: (1) it prevents any glass spicules from the broken ampoule neck from blocking the needle or reaching the tissues, and (2) if the needle is in a vein and the ampin is aspirated, blood which runs back up the needle will be readily seen on the filter fabric.

3. These two parts of the ampin are joined by a flexible *plastic tubing*. The thin neck of the ampoule can be broken in

the tubing, simply by bending it. The tubing is transparent, so that blood can be seen on aspiration, and the drug solution on injection.

The following additional facts given by the manufacturer are pertinent:

The ampoule is made of resistant glass. Its tip is specially constructed to allow easy breakage when the ampin is to be used; but the entire ampoule, including the tip, is strong enough to withstand pressures corresponding to an altitude of 100,000 feet at temperatures between 80°F and −60°F, or explosive decompression from 8000 feet to 35,000 feet in $2^1/_2$ sec.

The connecting tube is transparent and fungus-resistant.

The stainless-steel needle for the ampin to be used subcutaneously is of 22 gauge and is $^1/_2$ in. long, whilst that for intramuscular use is of 20 gauge and $1^1/_2$ in. long. Longer intramuscular needles are now available.

The device is either sterilised as a complete unit or (for heat-labile substances such as penicillin) assembled aseptically after sterilisation of the solution.

After the usual preparation of the patient's skin the needle-guard is broken and the needle inserted into the patient. (If the needle is in a vein, squeezing and release of the tubing will aspirate blood back to the filter.) With the ampoule held in such a way that the gas is above the fluid, the neck of the ampoule is now broken between finger and thumb, or by bending the tube. The pressure of the gas injects the fluid into the tissue. The used ampin is then thrown away.

The advantages of this technique are:

1. *Accuracy of dosage* is ensured. All the contents of the ampoule are injected, whereas with the conventional syringe injection portions may be left in the filed-off top of the ampoule, in the bottom of the ampoule, or even in the syringe itself. The inaccuracies and wastage in multi-dose vials are eliminated.

2. The solution injected is *sterile*, which cannot always be assured when multi-dose vials are used, let alone solution tablets.

3. The transmission of *homologous serum jaundice* is impossible.

4. The patient has the benefit of a new *sharp needle* at every injection, and there is no risk of cut fingers from the jagged broken tip of the conventional ampoule.

5. *Contact allergy*, suffered especially by nurses and pharmacists in handling antibiotics and even by technicians in servicing syringes, is prevented. This represents a financial saving not usually appreciated in comparative costings: not only does it save the cost of using rubber gloves and masks as recommended by the Ministry of Health, but it also protects the operator from allergic reactions. With streptomycin these have sometimes been so serious as to cause nurses to give up their profession.

6. As a *time-saver* the ampin is far superior to any syringe. The drug is instantly available in a sterile injection. No preparation or assembly of the syringe and needle is necessary. No drug needs to be drawn up. No dismantling and cleaning of the used syringe is required. The advantages for casualty surgeries, first-aid kits, and large-scale emergencies are obvious. Further, many patients who are at home on long-term therapy (e.g., streptomycin) can give themselves the drug without requiring daily visits by nurse or doctor—again saving cost. The multiple abscesses so often seen in diabetic patients from faulty sterilisation of their syringes are avoided.

7. Because of the bulk and tamper-proof qualities of ampins, narcotics in them are less liable to be pilfered by the *addict*. Nor is it possible to extract part of the contents and replace it with water as may be done with multi-dose vials of narcotics. On the other hand, their bulk can be a disadvantage where the drug cupboard is small.

The possibility of air embolism must be considered.

Under normal operation the maximum amount of gas that could possibly be injected is less than 1·5 c.cm., so there is no danger of fatal or even serious air embolism. Even if the ampin were improperly used—i.e., in the "bottom down" position in which none of the medicament is injected—the maximum amount of gas that could be injected is 2·6 c.cm. for the standard ampin, and 4 c.cm. for the large size. Much greater quantities of air have been inadvertently and harmlessly injected during transfusions and infusions.

5–10 c.cm. of air has been injected rapidly in men without producing clinical symptoms (Hamilton and Rothstein 1935). Moore and Braselton (1940) from animal experiments estimated that as much as 37·5 c.cm. of air can be injected into the pulmonary vein of a man without serious consequence. Shulman and Glass (1937) found that 30 ml. of intravenous air was well tolerated in healthy persons, and suggest that large amounts would be needed to kill them. Russ et al. (1953) cite a case where 500 c.cm. of oxygen was injected fairly slowly and recovery took place. The woman was ill but not suffering from cardiac or respiratory disease.

Air embolism, therefore, is unlikely indeed.

RELATIVE COSTS

At present the price of the device (exclusive of drug) is $7^1/_2d.$ to $8d.$ according to the size of the needle. When demand increases, production on a large scale will reduce this price considerably.

The cost of an injection, with or without a central syringe service, is difficult to obtain. Grainger (1956) estimated that in 1955 the cost of processing the syringe and needle was $4d.$, to which must be added the cost of collection and delivery by orderlies to and from the wards and theatres. (In his hospital, three people each spent about two hours a day on this, requiring some £200 per annum in wages.) Since the service had only lately started, with a very large stock of new syringes and needles, Grainger's figure for replacements was low. A report last year by the Nuffield Provincial Hospitals Trust puts the cost of supplying a sterile syringe and needle, in hospitals of three different categories, at $4{\cdot}75d.$, $5{\cdot}1d.$, and $5{\cdot}9d.$ per unit (plant depreciation excluded).

PRESENT INVESTIGATION

In a trial of ampins at the Weir Maternity Hospital the results were:

ALL INJECTIONS (900)	
Satisfactory	855 (95%)
Unsatisfactory (including error in administration technique)	45 (5%)
Unsatisfactory (excluding such error)	24 ($2^1/_2$%)
INTRAMUSCULAR INJECTIONS (693)	
Satisfactory	668 (96%)
Unsatisfactory (broken ampoule or punctured tubing, 8; error in technique, 14; no details, 3)	25 (4%)
Note.—One ampoule broke after the injection had been given.	
SUBCUTANEOUS INJECTIONS (116)	
Satisfactory	107 (92%)
Unsatisfactory (failed to flow, 2; error in technique, 5; no details, 2)	9 (8%)
INTRAVENOUS INJECTIONS (91)	
Satisfactory	80 (88%)
Unsatisfactory (leakage from tubing, 2; failed to flow, 1; error in technique, 2; no details, 6)	11 (12%)

This trial met at first with passive resistance from the nurses: at the end of two months, only a few dozen injections by ampins had been given, and some wards had not even drawn stocks from the hospital dispensary. Accordingly, orders were given that drugs which could be given by ampins should be given only in this way, and their conventional form was withdrawn from the wards. Within a few days the response was enthusiastic; and towards the end of the trial there were many complaints at the prospect of a return to ordinary syringe injections.

The relatively low percentage of success (88) with intravenous injections is easily explainable. Whereas most of the other injections were given by nurses, who had practised first with dummy ampins filled with water, all the intravenous injections were given by doctors, some of whom were not familiar with the method. A new anæsthetist, for example, might be given an ampin to give intravenous ergometrine, and this first attempt might swell the number of failures.

Not included in this survey, but relevant to it, are two patients with pelvic tuberculosis who were shown in hospital how to use ampins and then continued their course of streptomycin at home. They praised the ease of injection and the extra " mobility " through not having to wait for a daily visit by a district nurse. The saving of the latter's time must have been considerable.

CONCLUSION

The ' Ampin ' (a sterile automatic injection unit) is a more economical means of injecting drugs than the conventional sterile syringe. Hospitals should consider it as an alternative to a central syringe service, saving both time and money.

I am indebted to the medical and nursing staff of the Weir Maternity Hospital who carried out this trial; to Mr. R. J. Partington, of Camden Chemicals & Co. Ltd., who first brought ' Ampin ' to my notice, and to Ampins Ltd. (Guildford), Cuxson Gerrard & Co. Ltd. (Birmingham), the Distillers Co. (Biochemicals) Ltd. (Speke), and Evans Medical Supplies Ltd. (Speke) for the supplies of the ampins used for the trials.

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THE PROFESSION AND THE PRISONS

PENAL problems are occupying the minds of many people just now; so the annual meeting of the Howard League for Penal Reform on Nov. 4 was a particularly important one.

Viscount TEMPLEWOOD, after paying tribute to the memory of Margery Fry, stressed the complexity of crime and the need to tackle it on a broad front. Easy generalisations were a thing of the past, and public clamour for savage punishments must be resisted: study of criminality at different times and under different penal codes revealed the hollowness of such ideas. The present widespread interest and understanding led him to warn the meeting against a too pessimistic view of this difficult field.

Dr. H. K. SNELL, director of medical services of the Prison Commission, reminded the meeting that bad and unhealthy conditions in the gaols of older times should be considered in perspective with the generally low and insanitary state of life at the time. Howard laid the foundations of the medical service in 1774 with his Act for the preservation of the health of prisoners and the prevention of gaol distemper, which required an experienced surgeon or apothecary to be appointed to every gaol. The better coordination resulting from the establishment of the Prison Commissioners in 1877 led to the appointment of a medical inspector, and there had been medical men at the Prison Commission ever since. The improvement in prison medical facilities in general, the appointment of specialists, mass radiography, and the ready transfer of convicts to outside hospitals had been reflected in a steady improvement in prison health: the death-rate had dropped from 3·5 per 1000 in 1925 to 1·7 in 1954. The percentage of cases treated in hospital and sick parade had shown little change over the years, and overt malingering was seldom encountered. Not only physical health responded to careful treatment, for it was a common experience that remedial surgery with suitable psychological handling might modify a man's attitude to society, and a study at Portland showed that borstal lads operated on at the local hospital had an appreciably better prognosis than others.

Inevitably the prison medical officer realised that much of his interest lay in the mental sphere, and the number of cases remanded for psychiatric reports had about doubled since 1925. The transfer of ascertainable mental defectives to appropriate institutions often proved more difficult than it used to be, although the numbers sent were smaller. The examination of prisoners charged with murder, by an independent psychiatrist, was running smoothly; differences had been conspicuously absent. Extension of this practice to other classes, suggested by the Royal Commission on mental illness, would depend on the availability of experienced psychiatrists.

Dr. Snell believed that the concept of diminished responsibility had been welcomed by prison medical officers as a way round the restrictions of the McNaughten rules: in the short run it had shown its success in reduction in the number of after-trial inquiries. The use of psychiatric treatment in addition to diagnosis was of recent origin; and, although East and Hubert explored the possibility between 1934 and 1938, it really began with Mackwood at Wormwood Scrubs in 1943. There had been a modest expansion, and at present the Prison Commissioners had 8 psychotherapists giving some 22 sessions a week between them. Dr. Snell did not say how adequate he thought these 22 sessions were for a population of 26,000, although he believed that psychiatric examination of offenders should be used much more widely, and he was encouraging about the development of community methods, open doors, and discussion groups. There was a need to wed the psychiatric to the general medical services, and to enable the ordinary medical officer to understand his men better and use particular emotional reactions to their own good. It was necessary, he said, to realise that aggression must not be met by aggression and that the doctor must tread a difficult path between his duties to his patient and to officialdom.

There remained a great need for more specialist staff in the medical service, and for specially equipped centres for the investigation of cases.

TRIBUTE TO SIR CLEMENT PRICE THOMAS

NINE days before his retirement from the staff of Westminster Hospital, Sir Clement Price Thomas presided at the old students' dinner on Nov 13. Sir Stanford Cade, who proposed his health, said that some of his friends felt that what might please him most would be a link between his hospital and the Royal College of Surgeons. Five hours previously the council of the college had accepted a gift of 1000 guineas from members of the staff of the Westminster group of hospitals, to endow a prize to be known as the Clement Price Thomas award. He hoped that this would become the distinction most highly prized by young surgeons throughout the Commonwealth.

Having travelled the same surgical road with him for forty years, Sir Stanford said of the chairman: " He is what he is because of his qualities as a man ". Success had not robbed him of his humility or his humanity. In the first world war, though a dental student in a reserved occupation, he had joined the R.A.M.C. and become a corporal. In the second world war he had been consultant thoracic surgeon to the Army, R.A.F., and E.M.S. Since then he had been president of the Society of Thoracic Surgeons and of the Royal Society of Medicine, and now he was to be president of the Welsh National School of Medicine. (His loyalty to Wales is so infectious, Sir Stanford remarked, that, were it permissible, Welsh patients at Westminster would certainly get priority—not only from other Welsh but also from the English, Irish, and Scots.) As a surgeon Price Thomas would be remembered as one of the pioneers of thoracic surgery. Technical skill he had always in abundance, but to these he added surgical judgment, surgical courage, and his humanity. He had never had classes of students in the ordinary sense of the word: instead he had disciples. They were now all over the world and many patients saved by them owed their lives to him.

Medicine and the Law

Closed Shops

THE Chemists' Federation, a federation of manufacturers of proprietary medicines, wholesalers, and retail chemists, imposed on its members restrictions designed to implement the principle "That the correct channel for distribution of medical preparations is through premises registered under section 12 of the Pharmacy and Poisons Act, 1933."

The Federation compiled the "C.F. list," a list of proprietary medicines manufactured by its members, and its members agreed to submit all their eligible products for inclusion in the list and undertook that no product of theirs included in it should be supplied for sale to the public except through retail chemists: the supply was not restricted to retail chemists who were members of the Federation. The products offered for inclusion in the list were approved by the standards committee of the Federation who examined the formula of the medicine to see if it was suited to the conditions it was designed to alleviate and the claims made for it. The list was divided into class A products, those not advertised to the public generally, and class B products, which were so advertised. The original purpose of the restrictions was to protect chemists from competition from other traders. Although a considerable body, the Federation controlled less than half the trade in proprietary medicines, and nearly half the total output of all manufacturers was retailed to the public by unqualified persons.

The Registrar of Restrictive Trading Agreements referred the agreement to the court, and the Federation contended that its main restriction was not contrary to the public interest.

They sought to justify the restriction under section 21 (1) of the Restrictive Trade Practices Act, 1956, on the ground that it was "reasonably necessary, having regard to the character of the goods to which it applies, to protect the public against injury" (paragraph (*a*)), and/or "that the removal of the restriction would deny to the public . . . other specific and substantial benefits enjoyed or likely to be enjoyed by them . . . by virtue of the restriction" (paragraph (*b*)). Under (*a*) they contended that, since a qualified chemist was by law always in attendance at registered premises, members of the public were able to receive there about medicines the advice, and if necessary warning, which a qualified chemist, unlike an ordinary retailer, was competent to, and did, give. The public were thereby protected against the mis-use or excessive use of proprietary medicines. Under (*b*) they relied on that advice as a benefit which removal of the restriction would deny to the public and on three other matters of benefit: (1) the work of the standards committee; (2) the wide spread of chemists' shops, in that if the restriction were removed business would be lost to other traders and a number of chemists, particularly those in country districts and provincial towns, with a small turnover would be forced out of business; and (3) the better storage of medicines and a wider variety of stock offered by a chemist compared with an unqualified retailer.

Mr. Justice DEVLIN, reading the judgment of the court, said that the court did not have to consider the question whether or not a restriction was contrary to the public interest as a matter of policy or whether the Federation was a good or bad thing for by section 21 (1) of the Act they were bound to conclude that a restriction was contrary to the public interest unless it was brought within one of the categories there set out and also that it was not unreasonable, having regard to the circumstances and any detriment to the public resulting from it. It was not fatal to the Federation's case that the avoidance of injury was not the prime object of the restriction; it was enough that that should be the effect. The only significant distinction between a sale by a chemist and one by an unqualified person was that a chemist, if told of the condition to be relieved, had the training and ability to select the appropriate remedy and advise on its use. But in only a small minority of sales was there any need for it.

A sensible person in doubt about the right medicine would always go to a chemist and the removal of the restriction would in no way interfere with that. The restriction could only protect a fraction of that small minority, for to qualify for the fraction three conditions had to be satisfied; first, the buyer must be a person in need of advice but without the good sense to ask for it from a qualified source; secondly, he must be served by the chemist himself; and, thirdly, unless it was a matter of luck, there must be some manifestation which caused the chemist to make some inquiry. Applying their finding that the risk of injury was negligible to the terms of paragraph (*a*) of section 21 (1) the court had to ask themselves whether a reasonable and prudent man would enforce the restriction if he could. He would not do so unless he was satisfied that it afforded an adequate protection and also, that the risk of injury was sufficiently great to warrant it. It was not enough to show a mere chance of injury and the court found that the protection the restriction was supposed to afford was not reasonably necessary because the risk of injury was too slight and because, if the risk was greater than they thought, it afforded no real protection against it.

Dealing with the Federation's case under paragraph (*b*) his Lordship said that no more need be said about advice than that the opportunity of giving it was negligible. The work of the standards committee by itself, might well be considered of substantial benefit to the public, but there were other factors to be considered. His Lordship referred to the Proprietary Association of Great Britain and to the British Code of Standards relating to the advertising of medicines and treatments and said that there were bodies other than the Federation which controlled satisfactorily the advertisement of medicines without imposing restrictions, so that the work of the committee in relation to class B products was from the point of view of the public unnecessary and not a substantial benefit; in the case of class A products there was not the same need for scrutiny, nor did the benefit, if any, in either class outweight the disadvantage to the public of the general restriction on the sale of medicines. The court were not satisfied on the evidence that removal of the restriction would drive any appreciable number of chemists out of business or that over the whole of his business the average small chemist would be unable to meet the challenge of new competition. Nor did the court think that there was anything in the Federation's point about storage. The Federation, therefore, had failed to satisfy the court that a restriction which confined to chemists the right to sell medicine was justifiable under section 21.

Considering an application by the Registrar for an injunction, his Lordship said that when Parliament had resolved that a practice was not in accordance with the public interest, the court would not expect the Federation, whose council consisted of men of the highest repute, to carry on just as it had before, and they had been told that it had no intention of doing so. Up till now the Federation had not known whether its rules were good or bad and had been concerned simply to ascertain the effect of a new law. There was no case here for an immediate injunction; the Federation would be given time to put its affairs in order and should not have to do so under the

shadow of an injunction. If the Registrar were given good cause for dissatisfaction he could make another application. Declaration that certain agreed restrictions were contrary to the public interest; application for an injunction refused.

In Re Chemists' Federation Agreement.—*Restrictive Practices Court:* Devlin J. (president), Upjohn J., Lord Cameron, Sir Godfrey Mitchell, Sir Stanford Cooper, Mr. W. L. Heywood, and Mr. W. G. Campbell: Nov. 3, 1958. Counsel and solicitors: T. G. Roche, Q.C., and Joseph Dean (Kenneth Brown, Baker, Baker); Cyril Harvey, Q.C., and J. R. Cumming-Bruce (Treasury solicitor).

J. F. LAMB
Barrister-at-Law.

Negligence by Non-communication

A butcher was boning a piece of meat when the knife which he was using slipped and caused a wound in his abdomen. A doctor from a local general-practitioner or "cottage" hospital, with no resident surgical staff, made a quick examination on the spot and had the patient sent to hospital, where he examined the wound again.

During the course of that examination he used a probe. He came to the conclusion that the wound was superficial, gave instructions that it should be stitched, and the man sent home, and told to see his own doctor. That evening the butcher, who was suffering great pain and nausea, called in his own doctor. He told him that he had been informed by the doctor at the hospital that the wound was superficial. His own doctor did not appreciate that the hospital was a general-practitioner hospital, and was under the impression that the wound would have been examined by the casualty staff of a fully staffed hospital accustomed to dealing with injuries. He diagnosed a digestive complaint and prescribed liquid paraffin. The butcher grew worse and the following day his doctor sent him to another hospital where fulminating peritonitis was diagnosed and an operation performed which revealed a half-inch wound in the small bowel. Five days later he died.

His widow sued the doctor from the "cottage" hospital for damages in respect of his death, claiming that he had died as a result of that doctor's negligence in that, among other things, he had failed to diagnose that the wound had penetrated the abdomen and had failed to send a written message or to communicate directly with her husband's own doctor. The doctor denied negligence.

Mr. Justice BARRY said that it was the unanimous medical opinion that when there was a delay of over two days in operating after the onset of peritonitis the mortality risk was almost 100%, and if the delay were caused by any negligence by the defendant doctor the widow was entitled to recover. There was no attack on the defendant's *bona fides*; nor was there any suggestion that he did not try to do his best for the deceased. In the circumstances any negligence found against him was no reflection on his general professional reputation.

On the evidence it was impossible to suggest that the defendant was negligent in not arranging an immediate operation. His diagnosis was clearly wrong but it was not a negligent one. It was the unanimous medical view that there was extreme difficulty in ascertaining the depth of an abdominal wound. He was not negligent in failing to send the deceased to hospital for observation because close observation could be carried out at home, but if a patient were suffering from an injury of that kind it was essential for any reasonably skilful doctor to ensure that during the first 8–10 hours there was skilled observation by a nurse or at least by a relative who was apprised of the symptoms for which he must watch. Here the defendant not only did nothing to ensure adequate supervision during the critical hours but the deceased's own doctor was in fact misled, and it was not unnatural that that doctor should have disposed of the wound as of no real importance in relation to the deceased's symptoms of pain and nausea. Unless the deceased was a type to be trusted to convey a long and complicated message, the defendant should, by letter or telephone, have informed his own doctor of the exact nature of his findings. Had the defendant given the matter his serious consideration he would have appreciated that such an extreme lack of information was inevitably bound to result in a complete lack of the sort of observation which ought to have been made.

If the consequences of non-communication had been less serious, his Lordship might have taken a different view, but having regard to the risk involved if a penetration of the abdomen were undiscovered and untreated he was bound to hold the defendant guilty of negligence in law. Judgment for the widow for an agreed sum of £9050.

CHAPMAN *v.* RIX—*Queen's Bench Division:* Barry J.: Nov. 9, 1958. Counsel and solicitors: N. R. Fox-Andrews, Q.C., and Roger Ormrod, Q.C., (Leonard Tubbs & Co.); G. C. Baker, Q.C., and Peter Webster (Hempsons).

E. M. WELLWOOD
Barrister-at-Law.

Hormone Therapy not Marital Cruelty

A wife, who had married in 1950 and had a child in 1951, petitioned in an undefended suit for divorce on the ground of her husband's alleged cruelty. The allegations were *inter alia* that since a date in 1955 he had voluntarily received implantations of female sexual hormones in order to develop female characteristics. Her petition was dismissed.

The judge (Davies, J.), who dismissed the petition on May 22, 1958, said that the husband began to develop female characteristics, mentally at least, not long after the marriage. He had consulted psychiatrists and in 1954 was sent by a psychiatrist at Guy's Hospital to a distinguished physician, who had given evidence which made it plain that in his view this man suffered from a mental illness which made him feel like and want to be a woman. He had no physical abnormalities; and eventually on the advice of the psychiatrist and the physician and, of course, with his consent as a patient, he had been given doses of ovarian hormones, with the express intention, on the part of the doctors, to accelerate and facilitate the development of female characteristics. He now dressed as and was employed as a woman. He had left his wife in 1957 because he could not stand living with her and she was revolted by what was going on. It was a tragedy for them both; but it seemed utterly impossible to say that the husband's consenting to be treated in this way for what was plainly a mental illness was cruelty on his part. He could not help it any more than any other illness, and it appeared that he would have been no better if he had refused the treatment. The petition failed and must be dismissed.

The wife appealed. It was submitted on her behalf that if a husband voluntarily consented to a course of treatment which would have the effect not of curing but of deliberately accentuating characteristics which would be repugnant to his wife, his acts were intentional, could only result in wounding his wife and giving rise to a real apprehension of injury to her health, and thus constituted cruelty in law; that the doctor, in view of the psychiatrists' report, thought, as a doctor, that the form of treatment was right and proper; but that a doctor's conception of his duty to his patient might cut across what the law conceived to be a husband's duty to his wife. In answer to a question from Lord Justice ORMEROD as to whether the submission would be different if the same results followed from the similar treatment sometimes used for certain types of cancer, counsel said that the

position would then be different, for the treatment would be directed to the cure or alleviation of the cancer.

Lord Justice HODSON, giving judgment, said that he did not wish to add anything to the judgment of Mr. Justice Davies, with which he agreed. It amounted to this, that no action on the part of this man towards his wife could be described as cruel. The appeal must be dismissed.

Lord Justice MORRIS and Lord Justice ORMEROD agreed.

DOLLING *v.* DOLLING. *Court of Appeal:* Hodson, Morris and Ormerod L.JJ. Nov. 14, 1958. Counsel and Solicitors: Mark Smith (Lewis Barnes Wheeler & Co.).

M. M. HILL
Barrister-at-Law.

Public Health

THE NATION'S HEALTH IN 1957

FUTURE social historians will value the annual reports of the chief medical officer of the Ministry of Health for the light they throw not only on health and disease in the population but also on the population's changing attitude to medical problems. The latest report [1] says this of the fear of mental illness:

"It is tempting to believe that human progress springs from rational and objective thinking, but more often people respond to urges which in full consciousness they might well disown. One of the strongest forces affecting the history of psychiatry has been fear based on magical thinking about the causes of mental disorder and the early laws reflected the need of society for protection from this intangible menace. But the cloud of fear and ignorance which for centuries obscured the understanding and outlawed the victims of mental disorder seems to be lifting at least. Pleas for the protection of society are giving place to sometimes uncritical demands for the liberty of the individual."

In one outstanding respect the public, freed from fear, has succeeded where science had failed; for there can be little doubt that the humane and tolerant attitude which has grown up both within our mental hospitals and in the community has actually changed the form of mental disorder.

"The extravagant, flamboyant types of reaction which made the lunatic a subject for the variety stage or Grand Guignol are almost things of the past. So, too, are the precautions and restrictions which were formerly so necessary. The open door is, at present, the most striking acknowledgement of these changes."

CANCER OF THE LUNG

If there is now widespread enlightenment on mental disorders, the same can perhaps not yet be said of the relation of lung cancer to smoking. The report tells of a further increase of deaths from cancer of the lung and bronchus in males to 16,430; this is 815 more than in 1956 (an increase of 5·2%); the male death-rate from this cause rose from 726 to 759 per 1,000,000 living. In females deaths numbered 2689, which was 118 more than in 1956 (an increase of 4·6%); the death-rate rose from 111 to 116 per 1,000,000. The Minister has requested all local health authorities to disseminate the known facts and also the opinions of the Medical Research Council, which has concluded that the most reasonable explanation of the increase is that a major part of it is associated with tobacco smoking, particularly in the form of cigarettes.[2]

1. Report of the Ministry of Health for the year 1957. Part II: On the State of the Public Health, being the annual report of the chief medical officer. Cmnd. 559. H.M. Stationery Office. Pp. 292. 13*s*.
2. See *Lancet*, 1957, i, 1345.

INFECTIVE DISEASES

The year was marked by a pandemic of *influenza*, due to a new variant of virus A, which spread from the Far East. The World Influenza Centre at the National Institute for Medical Research in London, linked with influenza reference laboratories throughout the world, collected, collated, and made known information on the outbreak at an early stage. Field trials yielded clear evidence of the protective value of a vaccine including the prevalent strain of virus.

Primary vaccination against *smallpox* was carried out on 43·0% of the infants under one year of age, compared with 38·4% in 1956 and 36·4% in 1955. There were wide local variations in the acceptance-rates for routine infant vaccination—from 84·16% in Canterbury to 4·46% in the city of Leicester.

Notifications of *scarlet fever* fell below 30,000 for the first time. The rates in some rural areas were notably low—5 per 100,000 in Radnorshire, for instance, compared with 66 per 100,000 in England and Wales generally. The low rates in rural areas, says the report, presumably indicate the advantages of a sparsely populated area. The value of notification of scarlet fever now resides mainly in its function as an index of the level of streptococcal infection. In some outbreaks of sore throat unaccompanied by a rash, nephritogenic strains of streptococci have been isolated; and in at least one area penicillin has been administered prophylactically to close contacts. "A measure so simple which can avert so serious a disease as nephritis must surely warrant the closest consideration whenever one of the nephritogenic strains of streptococcus is detected."

In immunisation against *tetanus* the protection afforded by anti-tetanus serum (A.T.S.) may last for only about three weeks; and A.T.S. occasionally produces untoward reactions, which exceptionally are fatal. It is therefore worth considering active immunisation with tetanus toxoid; and patients who have been actively immunised in this way should receive a booster dose of toxoid in the event of injury, and should not be exposed unnecessarily to the risk of sensitisation to horse-serum through administration of A.T.S.

There was a further steep rise in the number of new cases of *gonorrhœa* in both sexes attending the clinics—from 16,377 to 19,620 in males, and from 4011 to 4761 in females. It is now apparent, says the report, that penicillin cannot by itself make a lasting impression on the incidence of this disease.

DELIVERIES IN HOSPITAL

In his introduction Sir John Charles, the chief medical officer, remarks that in hospitals imperfect human relationships may react unfavourably on the welfare of the patients.

"Their influence is probably more felt in the routine midwifery department than in the wards where acutely ill patients are admitted. Many of these difficulties are engendered by too impersonal an attitude of certain staff members towards the patients, possibly because of the pressure of work and consequent lack of time for the development of personal relationships. But another cause may be at work. Hospital confinement is becoming more and more organised as a team event and it is quite possible that the discipline and formality of technique necessary for the proper functioning of the individual members of the team may give to the patient the appearance of an indifference which is in fact only apparent . . . a cheerful smile or sympathetic glance may be all that is necessary to reassure an anxious mother and to give her the sense of security which it is the duty of the hospital to inspire."

In England Now

A Running Commentary by Peripatetic Correspondents

A CAULDRIFE East wind blew him into my surgery last January. He had arrived in Edinburgh from Jamaica a few days before to study sanitary engineering, and he complained of nagging pains and unpleasant paræsthesiæ in his hands and feet. The anamnesis seemed unremarkable but examination revealed some sensory impairment of a glove-and-stocking distribution. The sudden onset was disquieting: far from his home, was this young man about to be overwhelmed by a nasty peripheral neuritis? I gave a placebo and bade him return in two days. He came back, no worse and no better, but with an additional piece of information—the only time he found relief was when he was having a hot bath. As I bent down to pick up the penny, I asked "Tell me, how are the winters in Jamaica?" He replied "There is no real winter, it is always warm." I prescribed two pairs of gloves and two pairs of socks, while marvelling at the guise a well-known sensation can assume when it is described by someone experiencing it for the first time.

She was as beautiful as many butterflies because she changed her gay saris at least twice daily; and though not as proud as a queen she trod the deck as daintily as any princess. She did not skittle nor did she quoit, but she watched the flying fish; and the most strenuous exercise I ever surprised her in was placing a white bean on a tombola card. Yet, on the third day out of Colombo she presented herself at the surgery with a tender and swollen left wrist—a full-blown tenosynovitis. She had never been out of Ceylon before, and since boarding the ship, had been plying knife and fork for the first time in her life. I prescribed meals in the cabin for three days and gave her five minutes' instruction on how to grasp a fork lightly.

These are two minor examples of peripathology, my new specialty, which deals with ills that are neither here nor there, but which beset those who are foolhardy enough to move from there to here.

• • •

Over the years my wife and I have evolved some simple tests of the efficiency of a hotel. Most of them are obvious, such as having a light over the bed which you can switch off without getting out of bed, really hot water all the time, and a waste-paper basket in the bedroom. Naturally the Foresta, on the island of Lidingö outside Stockholm, where all the delegates to our conference are living, passes this G.C.E. of hoteliers. But I am happy to announce that it has also received the accolade of a great hotel by passing the Secret Slipper Test. In the really famous hotels of the world—Reids, Sheppeards, Sachers, the Crillon for instance (not that one has stayed in all of them but we have our methods, Watson)—one arrives, unpacks, and goes about one's business or pleasure, only to find at night that one's slippers have vanished. It is a battle of wits between you and the chambermaid, and the longer the treasure hunt lasts the more superior is the status of the hotel. Though pretty cunning myself by now, at the Foresta I was on the point of admitting defeat and telephoning the desk when I remembered "le scouting" and by lying prone on the floor I saw the well-loved silhouettes which had not only been pushed as far as possible under the bed but the bed itself drawn out from the wall to give additional cover. The management has been informed that it may add the letters O.S.S. after its name, as having been decorated with the Order of the Secreted Slipper.

• • •

My cousin Fred (said Ananias) was as enterprising a young doctor as ever went into a revolving-door behind you and came out in front. His first practice was nevertheless slow in growing until he encountered the Chief Sarsen of the Children of the Stones, a sect with an abhorrence of orthodox medicine and great faith in a diet of nuts. Their beliefs were based on abstruse calculations about the numbers of stones at Stonehenge. The Chief Sarsen apparently took his diet in the form of salted peanuts, which he found, unless Fred had been there first, on the bar at the more open-handed hostelries. When ultimately they met over a peanut, and the situation had been explained to him, Fred loudly approved the nut diet but felt it timely to mention the law à propos of coroner's inquests, certification of death, &c., in the case of doctorless persons. His masterly dissertation influenced the Chief Sarsen almost as much as the lighter-fuel Fred had poured over his peanuts. Indeed, his second act on recovering consciousness in Fred's surgery was to issue a fiat ordering all the Children to register with Fred forthwith. His first act had been to agree with Fred that it would be a pity if it became known that he had been inside (medically) licensed premises. To protect his flock from similar contamination while avoiding the contingency of comments by the coroner, and to satisfy Fred's zest for work, it was arranged that the 1500 Children should come past his house at the rate of ten a day and wave at him through the window while he was having his lunch.

All went well until ministerial reconstructions at Stonehenge resulted in the Inner Circle of the Sarsens doing a stock-take, when they discovered that the monolithic patriarch of the sect had accidentally included in his original count two of the milestones on the Salisbury road. This so drastically altered their calculations, deductions, and beliefs that every Child was instructed to have a medical overhaul twice a week on pain of lithotomy. Fred's premises were besieged, and although he nipped out with a fiddle and a false beard and did half an hour's busking to the crowds before letting them into the waiting-room, there was no adequate financial return and he finally left the district.

He was last heard of selling cheap gramophones to South Sea Islanders, and as he had thoughtfully thrown overboard from the ship every gramophone handle but one he was able to charge a substantial fee for winding them up. But the bienséance of the professions is alas! a handicap in the jungle of commerce. Fred's natural courtesy and sense of protocol forbade him, when dining with one of the chiefs, to leave the table until his host had finished. The fact that ultimately both left simultaneously would, I am sure, have flattered him had he been conscious of it.

• • •

One of the pleasures of this column is its freedom from the bibliographical approach. Shakespeare, certainly, is quoted, and there may be an occasional reference to that great work, the "Terms and Conditions of Service": but there is none of the usual preciosity about the "*Amer. J. pineal Dis.*". Probably the most common reference is to "In England Now" itself—and why not? Does self-sufficiency not rank as a virtue in the Welfare State?

May I be permitted, then, to refer to my interim report [1] on my genealogical researches describing how I had tracked my great-grandfather to Penzance? My knowledge has advanced, since then, by one whole generation. I now know the name and occupation of my great-great-grandfather, who turns out to have been a plumber in Penzance. (What atavistic instinct, I wonder, led me to choose to be house-surgeon to a urologist?)

It may be thought that an advance of one generation in one year is nothing to boast about. This chap, the reader may be saying, rushes prematurely into print. But since when have mere results been any criterion? Surely the main point has long been the diligence shown in the pursuit of facts? So I am unabashed, and the next time I apply for a job I shall tell the committee with pride that my most recent publications have been in the peripatetic columns of *The Lancet* and the question-and-answer columns of *The Plumber and Journal of Heating*.

• • • •

Western Medicine is well larded with familiar domestic similes, and after a prolonged tedium of billiard balls in the rectum, pears in the pelvis, and melon seeds in the synovium, I was gratified by perhaps the first example in Sub-Saharan surgery. On the extraction of a largish stone from the bladder of a Bakossi woman, my theatre nurse glowed with astonishment: "Na fine ting dat, big pass crocodile egg".

1. *Lancet*, 1957, ii, 691.

Letters to the Editor

GASTROINTESTINAL HÆMORRHAGE AND SALICYLATES

SIR,—The high prevalence of salicylate consumption in patients within seventy-two hours of gastrointestinal hæmorrhage (55 out of 103, compared with 17 out of 103 outpatient controls) reported by Dr. Alvarez and Dr. Summerskill in your issue of Nov. 1 was of great interest. From a clinical inquiry reported in your issue of July 26 (p. 179), we concluded that aspirin was a rare cause of hæmorrhage or perforation. In our series, the prevalence of aspirin consumption within fourteen days of admission to hospital in patients with hæmorrhage or perforation was almost identical to that for a control series of acute abdominal emergencies matched for age and sex. For hæmorrhage and perforation considered together the figures were 61 and 59 respectively out of totals of 129; 25 patients in each group consumed more than 12 tablets.

As our conclusions conflict with those of Dr. Alvarez and Dr. Summerskill we have analysed our data afresh (see table).

In acute lesions with hæmorrhage the prevalence of aspirin consumption was about twice that of their controls but in the remaining cases of hæmorrhage there was no such difference.

—	Acute ulcers	Controls	Other cases	Controls
All cases of hæmorrhage or perforation:				
No. of patients questioned within 2 weeks:	33	33	96	96
Aspirin, total	20	15	42	44
Aspirin, 12 or more tablets	7	7	18	18
Cases of hæmorrhage:				
No. of patients questioned within 2 weeks:	27	27	73	73
Aspirin, total	19	10	36	34
Aspirin, 12 or more tablets	7	6	15	15

Of 19 "aspirin-positive" cases with an acute lesion, 11 had consumed aspirin within seventy-two hours of the onset of hæmorrhage (10 within twenty-four hours), but 10 had also consumed it within the preceding period; in 5 cases the exact time relationship was uncertain.

Fundamentally, the problem in such a statistical survey is the selection of controls, and, to a lesser extent, the identification of the acute-ulcer case. With regard to the former, Dr. Alvarez and Dr. Summerskill chose dyspeptics attending outpatients for diagnosis and we chose acute surgical emergencies. Whilst the higher rate of aspirin ingestion in our series of controls might be explained in part by the fact that pain was usually a dominant feature of their illness, this also illustrates the difficulty in choosing a comparable control. Similarly it might be supposed that patients referred to a gastroenterological clinic would be taking less aspirin because they had received other remedies from their doctor, anticipated expert therapeutic advice at the hospital, or had improved while awaiting their appointment.

It is now evident that salicylates could be an important cause of gastrointestinal bleeding but probably only in the so-called acute-ulcer group. It is difficult to understand why, in a country where nearly 4000 million tablets are consumed annually, massive hæmorrhage due to aspirin should be a relative rarity; it is uncommon even in attempted suicide when large doses are consumed. It would be only reasonable to suppose that aspirin causes massive hæmorrhage only in combination with other ætiological factors which are as yet unknown.

We apologise to your readers for misleading them in our article, and to Miss Barbara White who gave statistical help but did not share our responsibility for the ultimate analysis.

Norwich. A. ALLIBONE.
Sheffield. F. J. FLINT.

SIR,—The detailed study of Dr. Alvarez and Dr. Summerskill seems to add considerable support to a causal relationship between salicylate ingestion and gastrointestinal hæmorrhage. However, as they pointed out, different investigators have come to different conclusions concerning this relationship. A recent study by Allibone and Flint,[1] for example, concluded that aspirin was a rare cause of bleeding in peptic ulcer. The difficulty seems to lie in the selection of suitable controls, and in this regard the clinical part of the paper by Dr. Alvarez and Dr. Summerskill is open to some criticism which weakens their argument.

Studies by Engel and his group in particular,[2 3 4] as well as others,[5 6] have pointed out the important and stressful psychological events which so often precede acute and chronic illnesses of many sorts, including many not generally considered to be "psychosomatic diseases". In addition it is well known that psychological stress can produce marked effects on adrenocortical homœostasis.[7] In these terms, the events and symptoms preceding an elective outpatient visit may well be different from those occurring before a bleeding episode with admission to the hospital, and it seems reasonable to expect any resultant effects on the gastrointestinal mucosa to differ as well. The two groups might, for instance, show differing mean plasma-pepsinogen levels twenty-four hours prior to clinic visit or hospital admission respectively.

It must then be asked why the future bleeder took aspirin more frequently during the twenty-four hours before admission in the first place; the authors state that there was no evidence that it was due to symptoms of bleeding. Is it not possible that the "habitual reasons" cited, such as headache and insomnia, were operative more frequently in the group about to be hospitalised because they were under more psychological stress, and that the use of a salicylate was merely an incident in the patient's response to that stress?

Allibone and Flint's use of a control group who had been admitted to the hospital for surgical emergencies other than gastrointestinal bleeding (and in whom there was no apparent difference from those who had bled in the amount of salicylates ingested before admission) seems to me to be a more valid approach to the problem. Dr. Alvarez and Dr. Summerskill may well be correct in their conclusions; the results of the part of their study investigating salicylates and occult bleeding are certainly convincing. But in terms of the bleeder admitted to hospital, I do not think that the question of the role played by salicylates has yet been completely settled.

98th General Hospital,
U.S. Forces, Germany. JOHN S. DAVIS.

NEUROLOGICAL SYNDROMES ASSOCIATED WITH CARCINOMA

SIR,—All interested in cancer or the care of its victims will feel grateful to Sir Russell Brain and Dr. Henson for the lucid description they have given, in their article of Nov. 8, of the non-metastatic neurological disorders that may be associated with a carcinoma. The stimulating way in which their report is written and the importance of the subject encourage me to record a few observations made while examining a much smaller material.

1. Allibone, A., Flint, F. J. *Lancet*, July 26, 1958, p. 179.
2. Engel, G. L. *Amer. J. Med.* 1955, **19**, 231.
3. Greene, W. A., Jr., Young, L. E., Swisher, S. N. *Psychosom. Med.* 1956, **18**, 284.
4. Schmale, A. H., Jr., American Psychosomatic Society, Atlantic City, May 4, 1957.
5. Papper, S., Handy, J. *New Engl. J. Med.* 1956, **255**, 1067.
6. Hinkle, L. E., Wolf, S. *J. Mt. Sinai Hosp.* 1952, **19**, 537.
7. Hill, S. R., Jr., et al. *Arch. intern. Med.* 1956, **97**, 269.

Firstly, the small size of growth which may be associated with fatal neurological disorder requires emphasising. In all th.ee cases of carcinomatous peripheral or sensory neuropathy which I examined port mortem, the carcinoma was small. In one [1] (sensory neuropathy) the only carcinoma tissue was a deposit, the size of the nail of the little finger, in the lymph-node at the bifurcation of the trachea. No primary carcinoma was found on the most meticulous examination of the rest of the body, including sectioning the lung after fixation into 5 mm. cubes. This case was associated with a plasma-cell infiltration of the brain-stem. Although the carcinoma in the lymph-node was also infiltrated with plasma cells, it was not possible to identify carcinoma cells beyond doubt in the brain-stem. The possibility of an encephalitis due to the presence of carcinoma cells could not, however, be excluded, though there was no evidence of the latter's responsibility for the lesions in the posterior-root ganglia.

In a second case [2] (sensory-neuropathy type) again no primary growth was found, carcinoma tissue being restricted to the cervical lymph-nodes. The third case (peripheral neuropathy clinically; anterior-horn cells and posterior-root ganglia degenerated pathologically), under the care of Dr. G. W. Hearn, was associated with a carcinoma of the colon no larger than a shilling in diameter. The carcinoma could not be detected from the outside of the bowel, was symptomless and there were no metastases. In a fourth case, under Mr. J. M. Small's care, the neoplasm was not a carcinoma but a myeloma, again very small and confined to a single vertebra. In this case the lesions consisted of retrograde degeneration of the anterior-horn cells and vacuolation of muscle-fibres with signs of nuclear activity (swelling and vesicularity).

The small size of these tumours need not necessarily detract seriously from the toxic theory. Presumably only some tumours form the necessary toxic substance or only some patients have the necessary susceptibility of the nervous system. These patients may die from their nervous disorder while the cancer remains very small; in all others the tumour may reach a large size without neurological symptoms developing. The presence, in our patient with the myeloma, of nervous-system and independent muscular lesions suggests that the term neuromyopathy is a realistic one, and we must be grateful to Sir Russell and Dr. Henson for introducing it.

We have recently studied a case (under the care of Dr. E. R. Bickerstaff) of carcinoma of the gallbladder in which there was a carcinomatous meningitis with degenerative lesions in the muscles quite different from neural atrophy and resembling those seen in our myeloma case. Thus the picture may be very complicated. Sir Russell and Dr. Henson write, " post-mortem examinations have ensured that the syndromes described here have not been due to secondary deposits ". No doubt these examinations have been of the required meticulousness, but others less experienced with the problem may not realise that to exclude a carcinomatous infiltration as the cause of a peripheral neuropathy, it is not enough to examine the spinal cord and the posterior-root ganglia and spinal roots at suitable levels, but it is also necessary to examine that portion of the anterior and posterior roots which lies between the ganglia and the arachnoid cul-de-sacs. We have seen a case [3] in which the lesions responsible for the features of peripheral nerve degeneration were practically limited to this region. Clinically, Sir Russell and Dr. Henson say, the sensory neuropathy may be pure, i.e., without weakness. It should, however, be remembered that the mechanism of collateral re-innervation of muscle is so effective that weakness may long be kept at bay. In fact, we have found degeneration of motor axons in both cases of sensory neuropathy on whom we performed muscle biopsy. The changes resembled closely those seen in vitamin-B_{12} deficiency [4] and suggest that some similar metabolic cycle may be interfered with in both conditions though not necessarily at the same point.

Finally, we would draw attention to the remarkable degree of sprouting of the distal extremity of the motor axons which we have encountered in the cases of carcinomatous and myelomatous myopathy quoted above.

An additional case (under the care of Dr. Bickerstaff) presented as a peripheral neuropathy with predominantly sensory symptomatology in which muscle biopsy showed slight perivascular cellular infiltration. In the neighbourhood of one of these infiltrations was what appeared to be a small group of carcinoma cells, though definite evidence of carcinoma is still outstanding. In this case, as in those just mentioned, there was a most pronounced sprouting from the distal extremity of the motor axons. Resembling that seen in myositis, thyrotoxic myopathy, and dystrophia myotonia, it presumably represents a reaction to certain substances which may be liberated during degeneration of muscle-fibres. In this sense alone every carcinomatous myopathy is to some extent a neuromyopathy. To add that these changes in the nerve-endings resemble to a considerable extent those seen in myasthenia gravis, perhaps takes us some way towards understanding the myasthenic symptoms encountered in some of their cases by Sir Russell and Dr. Henson.

We are still ignorant of the essential mechanism by which carcinoma destroys the nervous system, but observations such as those reported by Sir Russell and Dr. Henson surely advance us towards its discovery and thereby to the saving of lives which would not otherwise be forfeit to so small a tumour.

The Midland Centre for Neurosurgery, Smethwick.

A. L. WOOLF.

1. Bickerstaff, E. R., Woolf, A. L. *Bghm med. Rev.* 1958, **20**, 355.
2. Gray, K. W., Woolf, A. L., Wright, E. A. *Guy's Hosp. Rep.* 1955, **104**, 157.
3. Connolly, R. C., Woolf, A. L. *Bghm med. Rev.* 1958, **21** (in the press).
4. Coërs, C., Woolf, A. L. Innervation of Muscle. Oxford (in the press).
5. Woolf, A. L., Bagnall, H. J., Bauwens, P., Bickerstaff, E. R. *J. Path. Bact.* 1956, **71**, 173.
6. Corcoran, A. C., Rabinowitz, I. M. *Biochem. J.* 1937, **31**, 343.

SERUM-CHOLESTEROL LEVELS AND BLOOD-PRESSURE OF ALASKAN ESKIMO MEN

SIR,—Dr. Scott and his colleagues (Sept. 27) intimate that they and others have not confirmed the low levels of serum-cholesterol reported by Corcoran and Rabinowitz in a study of serum-lipids of the Eskimo of the Canadian Eastern Arctic.[6] The publications referred to in support of this thesis have not displayed their full data—or I take it they have not, since each of the three is an abstract. I shall therefore confine my comments to the data and conclusions of Scott and his colleagues.

First, Alaska is not Eastern Arctic Canada. Next, customs and conditions may well have changed during the past 22 years of expanding " civilisation ". Lastly, the means found by Scott et al. may be significant. However, the spread of the data is very wide. It includes lower limits of 109, 123, 122, 133, 166, 131, 179, and 186 mg. per 100 ml. in the various age-groups. Many of these values would be considered very low in this country and some of them lower than Schneckloth, Stuart, and I found in a recent survey in St. Kitts, Leeward Islands of the West Indies (data being assembled for publication). In brief, the spread suggests an inhomogeneity of the population studied. Some may have adhered to traditional diets. Others may have taken up American customs. If this is the case, conclusions derived from means would hardly controvert the findings of Corcoran and Rabinowitz, in which the method used tends to yield lower estimates than the method used by Scott et al.

Research Division, Cleveland Clinic Foundation, and Frank E. Bunts Educational Institute, Cleveland, Ohio.

A. C. CORCORAN.

THE STOMACH IN PERNICIOUS ANÆMIA

SIR,—Your leading article of Nov. 15 refers to the conventional view that achlorhydria is a constant feature of this disease. In recent years doubt has been thrown on the significance of "histamine-fast achlorhydria" as it is usually defined.[1–4]

Card et al.[4], using an augmented histamine test and measuring the gastric pH in 500 cases of "histamine-fast achlorhydria" not due to pernicious anæmia, found evidence of acid secretion in all of them. An investigation of gastric pH during a fractional test-meal in patients with pernicious anæmia showed that many of them also secrete small amounts of hydrochloric acid.[5] Sometimes enough acid is secreted to reach the level of "free acid". This finding is in accord with the histological picture of the gastric mucosa [6] which shows that complete atrophy is present only in a minority of cases of pernicious anæmia. It also lends support to the theory of Magnus [7] that the mucosal failure is a gradual process following a basic biochemical lesion.

It seems that there are no absolute changes in gastric-acid secretion in pernicious anæmia, and the absence of achlorhydria should not necessarily exclude this diagnosis.

Paddington General Hospital, London, W.9. ALLAN JACOBS.

FUTURE OF MENTAL-DEFICIENCY PRACTICE

SIR,—Dr. Dutton (Nov. 1) may leave many of your readers with the impression that "mental-deficiency practice" has only to do with what the Royal Commission termed the severely subnormal, for he suggests that the present association of mental deficiency with psychiatry is unrealistic. At least half the present-day adult population of such hospitals are above the grade of severely subnormal, are best covered by the American term mental retardates, and comprise many covered by the Royal Commission term "psychopaths". There are a number of mental-deficiency hospitals specialising in the treatment of personality disorders, as there are others specialising in the medical problems of the severely subnormal. Both groups may give rise to problems in acute mental illness.

Balderton Hospital, Newark, Notts. MICHAEL CRAFT
Deputy Medical Superintendent.

BLIZZARDS

SIR,—The stories of babies born in snowdrifts always seem to end happily and are rather charming, until one wonders what it would be like if the patient had a perforated duodenal ulcer. Winter coming on, it is time to protest about present road and traffic conditions which mean that, in some parts of the country, a bad snowstorm can make it absolutely impossible for doctors and district nurses to do their work effectively. This is an extremely serious matter at any time and may be calamitous in an influenza epidemic.

Experience last winter was a clear warning that with the present heavy traffic on the roads bad blizzards followed by the weather of 1947 might cause a national emergency. It might be a long time before the heavy machinery needed to clear deep drifts could get anywhere near them. The first precaution, therefore, seems to be to broadcast a blizzard warning urging all unessential traffic (particularly goods vehicles with non-urgent loads) to keep off the roads; and the second would be to warn (or compel) every driver to carry a quantity of grit, in proportion to the weight of his vehicle, and a shovel, a pick, and some rope. A bag of cinders or coke is adequate for a small car, but a lorry needs big sacks of proper road grit.

A third move would be to ensure better coordination of snow-clearing operations; it often happens that urgent traffic on a main road is held up while the local authority's men are clearing a long lane to a couple of farms where there are already tractors, horses, and plenty of labour.

The first steps to be taken by the local authority in any heavy snowstorm must include clearing a way to the doctors' and nurses' garages. District nurses lead a very tiring life, and they are not all young and strong; it is an outrage that they should be left to waste their time and energies shovelling mountains of snow from their garage doors. When they have at last got away on their rounds the snow-plough comes along and piles up a huge bank of snow across their gateway, and they have to dig their way in again. Finally, when they are out on their evening rounds a little plough comes up the footpath and pushes up another ridge of snow. It does not look much of an obstacle, but if there is a keen frost it will be a matter of very hard work with a pickaxe.

Wetherby, Yorkshire. R. L. KITCHING.

SKIN FRAGMENTS REMOVED BY INJECTION NEEDLES

SIR,—While congratulating Mr. Gibson and Dr. Norris on their excellent article in your issue of Nov. 8, I should like to point out that the late Mr. J. E. H. Roberts taught many generations of his dressers and house-surgeons at St. Bartholomew's Hospital that if a large hollow needle is forced through the skin it must drive a core of skin and debris deep into the tissues.

An incised puncture wound was therefore to be made in the anæsthetised skin with a narrow-bladed scalpel, the large needle is then easily introduced through this small incision. This procedure obviates the danger of skin emboli and substitutes an incised for a lacerated wound.

North Devon Infirmary, Barnstaple. M. P. MOREL.

CHILDREN IN HOSPITAL

SIR,—In his letter of Nov. 8 Mr. Robertson writes: "In fact this film was shot with every precaution we could devise to ensure an unprejudiced account of the run-of-the-mill behaviour of very young children in hospital. The child was selected at random from a hospital waiting-list." We think a random sample of one is a reductio ad absurdum in this context. It seems that all Mr. Robertson can reasonably claim is that he has given an unprejudiced account of the behaviour of one very young child in one hospital. This observation must be repeated on a random sample of reasonable size, drawn from a random sample of hospitals, before any generalisation can be made with regard to the run-of-the-mill behaviour of very young children in hospital. It may well be that Mr. Robertson is right, but he has not proved it. All he has at present is an important hypothesis which, we expect, he will submit to rigorous proof in the tradition of Dr. Bowlby's work.

Chailey Heritage (Craft School and Hospital), Chailey, Sussex. ELSPETH STEPHEN
ELIZABETH WHATLEY.

SIR,—I have followed with interest the letters on this subject. I thought your readers may be interested in my experience of allowing small pre-school children to visit their mothers regularly during the lying-in period.

1. Shay, H., Komarov, S. A., Berk, J. E. *Gastroenterology*, 1950, **15**, 110.
2. Roth, J. L. A., Bockus, H. L. *ibid.* p. 374.
3. Shay, H. *in* Postgraduate Gastroenterology (edited by H. L. Bockhus), London, 1950.
4. Card, W. I., Marks, I. N., Sircus, W. *J. Physiol.* 1955, **130**, 18P.
5. Jacobs, A. *Brit. J. Hæmat.* 1958, **4**, 465.
6. Joske, R. A., Finckh, E. S., Wood, I. J. *Quart. J. Med.* 1955, **24**, 269.
7. Magnus, H. A. *J. clin. Path.* 1958, **11**, 289.

This is a private midwifery home with an average of 306 deliveries a year over the past ten years. The usual number of patients is 10 or 12—3 in private rooms and the remainder in 2- or 3-bedded wards. The children in the family are allowed to visit from the first day, and boxes of odds and ends are provided for them to play with, though I must confess they prefer the contents of the bedside cupboards and drawers. The tiny ones sit on the mothers' beds for a play and a cuddle. It is nearly always necessary to explain to their families that if the child appears to be upset and cries when leaving it is better to allow the visits to continue, rather than that the child should bottle up its fears. After a few days they come and go very happily. My early fears that child visitors would bring infection have so far proved groundless.

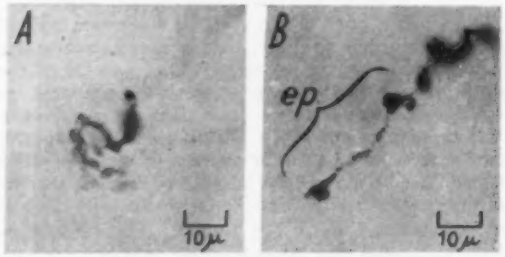
Doris Court Nursing Home,
Whalley Range,
Manchester.

MARY WALSH
Matron.

ABNORMAL END-PLATES IN MYASTHENIC MUSCLE

SIR,—Your leader of Sept. 6 on thymectomy and myasthenia gravis considered the possibility of structural changes at the motor end-plate in this syndrome. We are gathering new evidence on this problem in a current study in which we attempt to correlate histopathological observations on neuromuscular biopsies from myasthenic muscles with the severity of the functional disorder as seen in electrical records obtained from the same muscle sample before excision.[1,2] Such correlations are required in any critical study of the myasthenic disorder since it is well known that the amount of weakness and pathological fatigability can vary a great deal in different patients, and even in different muscle-groups of a given patient.

In six of the seven myasthenic patients so far investigated we found an unusual and specific anomaly of the arborisation of the motor axon. The anomaly consists in an elongation and lack of arborisation of the terminal motor axon as it joins the subneural apparatus of the motor end-plate. The accompanying photomicrographs show examples of an apparently normal end-plate (A) and an elongated end-plate (B) seen in the same biopsy specimen from the flexor carpi radialis muscle of a patient with a moderately severe myasthenia (vital staining with methylene-blue [3]). This muscle was undoubtedly myasthenic as shown by the typical decrement of successive



Motor end-plate from myasthenic muscle (biopsy specimen). Vital staining with methylene-blue. ep = end-plate.

electrical responses to 3-per-second supramaximal stimulation of the median nerve, and also by the demonstration of a post-tetanic increase in the amount of neuromuscular block.[4]

This anomaly involves a variable proportion of the motor endings. In the most severely affected patient 45% of the motor end-plates seen in the biopsy specimen were typically elongated. In the other patients the proportion of pathological endings ranged from 3% to 20%. It is interesting to note that in five patients (including the most affected one) the muscle-fibres had a normal histological appearance: no deviation from normal was found for fibre diameter, number of muscle nuclei, and innervation ratio, and there were no signs of muscle degeneration. Clearly in these cases the myasthenic syndrome cannot be considered a special form of a myopathic disease. In one patient, however, typical though mild signs of muscle degeneration were seen, and some end-plates were not unlike those seen in polymyositis. Such differences obviously raise the question whether the myasthenia syndrome might not be common to different disease processes, but larger series must be investigated before any useful deductions are made on this crucial point.

In any case it is clear to us that abnormal elongated end-plates are not found in patients who do not have the myasthenic syndrome and that this anomaly can occur without any degeneration of the attached muscle-fibre. In other words, it cannot be considered simply as a secondary reaction of the motor-nerve terminal to dystrophic changes within the muscle itself. Also it seems not unreasonable to assume that the peculiar elongated end-plates result from some long-term dysplastic process (as opposed to a more or less acute transformation) affecting the presynaptic motor-nerve terminal. Finally the demonstration of clear-cut and specific structural anomalies of the terminal innervation in these patients emphasises the importance of the local neuromuscular disease process in the myasthenic syndrome.

Faculté de Médecine,
Université de Bruxelles, Belgium.

C. COËRS
J. E. DESMEDT.

1. Coërs, C., Desmedt, J. E. *Neurology*, 1958, **8** (in the press).
2. Coërs, C., Desmedt, J. E. *Acta neurol. belg.* 1958, **58** (in the press).
3. Coërs, C. *ibid.* 1955, **55**, 741.
4. Desmedt, J. E. *Nature, Lond.* 1957, **179**, 156.

THYMECTOMY AND MYASTHENIA GRAVIS

SIR,—Letters by Dr. Laurent (Sept. 27) and Dr. Zador (Nov. 8) prompt me to set down some personal findings with cortisone acetate.

I suffer from multiple sclerosis and one of my principal symptoms was gross fatigue after 30 minutes' activity. This recovered after a period of rest, very reminiscent of myasthenia gravis. Neostigmine, however, was without effect. In the mood of "try anything once" I took cortisone acetate and found, to my amazement, that my staying power was quadrupled or increased even more by these drugs.

Since then I have lived on the acetate or the hydrocortisones, keeping my dose of the acetate (25 mg. t.d.s.) as low as possible, compatible with efficiency and avoiding most of the side-effects. A monthly blood-pressure reading, weighing, daily doses of potassium, and plenty of calcium (milk) have kept me happy, doing a comparatively energetic job for this organisation.

I should be very interested to hear of any comparable results.

The Cheshire Home, Staunton Harold,
Ashby-de-la-Zouch, Leicestershire.

R. H. FARRELL.

INTRA-ARTICULAR THERAPY IN RHEUMATOID ARTHRITIS

SIR,—Dr. Chandler's objection (Nov. 15) to my use of the word "odd" is a verbal quibble.

Odd . . . unusual (O.E.D.). Why use a long word when a short one will do? Or, if Dr. Chandler prefers it, why be sesquipedalian? Perhaps Dr. Chandler is more familiar with Roget, "remaining, exception, single, insane, vulgar, ridiculous, -fellows, -fish".

The "t" test is not valid for distributions which are not normal. The assumption is that the departure of Dr. Chandler's categories from a normal distribution is extreme. Hence my plea that when these odd devices are used the figures from which "t" is calculated should be quoted.

Student wrote in his classic paper, "This assumption (a normal distribution) is accordingly made in the present paper, so that its conclusions are not strictly applicable to populations known not to be normally distributed."

London, S.E.3.

G. E. LOXTON.

TREATING TUBERCULOSIS

SIR,—Your annotation of Oct. 25 claims that tuberculosis now poses little problem in its treatment, which can at last be reduced to simple terms—in the main the prescription of a satisfactory combination of the standard antituberculous drugs. I agree that good chemotherapeutic management has radically altered the outlook for the tuberculous and is of overriding importance in treatment. Its use has reduced the need for other forms of management. In the more advanced centres artificial-pneumothorax treatment has virtually become an anachronism; major surgery is required infrequently, and most commonly for patients with organisms resistant to two or more of the standard drugs—streptomycin, *p*-aminosalicylic acid (P.A.S.), and isoniazid.

It is well that the simplification of treatment by effective chemotherapy should be generally recognised, but there is a danger in oversimplification. It is important that some of the pitfalls should be recognised and certain aspects of treatment stressed.

(1) An adequate combination of drugs must be taken *for a sufficiently long period which is uninterrupted*—from 18 months to 2 years, in the average case. Quite rightly the period of inpatient treatment is now being curtailed, the patient often being retained in hospital only while he is infectious. In consequence the longer period of treatment is on an outpatient or domiciliary basis, perhaps with the patient already back to work. It is well known that a high proportion of outpatients are likely to default in taking drugs. This problem has been very adequately described in your leading article of Nov. 1. It is reasonable to suppose that the patient's reliability in taking drugs will be influenced by his physician. The physician's interest, enthusiasm, and personality remain as important as ever, and his responsibilities do not end with knowledge of what constitutes an adequate prescription.

(2) A proportion of new patients have been infected with an organism resistant to one or more of the standard drugs. A Medical Research Council trial showed this proportion to be about 5% in this country in 1957, but it is to be expected that our diminishing infective pool will contain an ever higher proportion of drug-resistant cases in the future—their continued infectivity being a consequence usually of drug resistance. The proportion of newly diagnosed cases infected with resistant organisms can be expected to increase. At present the majority of patients with primarily resistant organisms show resistance to only one of the three standard drugs, and a triple-drug regime, at least until such time as sensitivity results are known, will lessen the possibility of resistance emerging to yet another drug. It is advisable that each drug in such a triple regime should be given in adequate amount and often sufficiently. The regime of twice-weekly streptomycin with daily P.A.S. and isoniazid used by Allan,[1] and mentioned in your annotation, may well fail if initial unsuspected resistance to P.A.S. exists. Treatment is then tantamount to twice-weekly streptomycin with daily isoniazid—a regime which will allow the emergence of organisms resistant to isoniazid and streptomycin with much more frequency than isoniazid combined with daily streptomycin.

It is not unlikely that the proportion of new patients infected with *doubly* resistant organisms will show an increase in the future. If so, even the triple standard drug regime may prove hazardous and a reorientation of our approach to treatment may be necessary.

(3) All of the standard drugs produce toxic effects in greater or lesser degree and hypersensitivity reactions are frequent. Experience of the management of such reactions is important to allow continuation of chemotherapy with as little interruption as possible.

(4) The role of the bacteriologist in the accurate diagnosis and management of tuberculosis is an important one. But bacteriological reports can be misleading. The physician of experience, correlating bacteriological with clinical data, the chemotherapeutic history and the history of contact, will interpret laboratory reports with intelligence. His liaison with the bacteriologist will be as close as possible; he will know what degree of reliability can be placed on the results of any particular bacteriological test, which results require further confirmation, which are likely to be misleading or even erroneous.

A disproportionately high fraction of the average chest-physician's time is at present devoted to a small section of his total case-load. This section consists of the patients with organisms resistant to the standard drugs as a result of faulty drug treatment in the past. Their management demands considerable skill as well as time. It is to be hoped that mistakes of the past will not be repeated. Present trends suggest that tuberculosis will soon become an integral part of general medicine once more. This is a desirable development in many ways, but the physician who treats tuberculosis should be fully equipped for this duty. It is now easy to achieve permanent bacteriological cure in 80% or even 90% of new patients with tuberculosis. Such results are dazzling in comparison with those of a decade ago, but we accept them as satisfactory at our peril. We must aim at permanent cure for all patients and seek the explanation for failures, which should be rare. It is dangerous to accept any objective short of complete control of tuberculosis and a community free of infection. Otherwise we face the prospect of a permanent pool of infectious patients, drug-resistant in large part, and a persisting menace to the public health.

Royal Victoria Hospital,
Edinburgh. J. D. ROSS.

1. Allan, A. R. *Amer. J. Med.* 1958, **25**, 75.

BANTING UP TO DATE

SIR,—Major Hamilton (Nov. 1) points out the incontestable fact that organisms adapt themselves rapidly to a new environment. But this in no way detracts from the importance of assessing how new that environment is and how far, therefore, the adaptation has proceeded.

In the matter of cooking food, for example, Le Gros Clark points out in his *History of the Primates* that this practice has been going on for half a million years. Per contra, the use of refined flour and refined sugar by the main mass of our population has been going on for only about two centuries. For example, sugar consumption per head per year in the United Kingdom in 1815 was about 15 lb., whereas today it is around 105 lb.

The naturalness of any new factor in the environment must at all times be assessed in relation to the time factor. The consumption of cheap refined carbohydrates is then revealed as dangerous indeed. But that does not mean that the consumption of these materials is going to cease. On the contrary, the struggle for existence is almost certainly going to compel adaptation to them, since they are so much cheaper to produce. But the cost in suffering during this process of adaptation is going to be very high, and there is no reason why individuals should not save themselves if they wish to.

Dr. Mackarness' book gave me the impression that the diet in obesity should consist of protein and fat, but not, for practical purposes, carbohydrate. In short, the carbohydrate calories must necessarily come from extra fat and protein. There is a world of difference between eliminating carbohydrates to this extent and substituting unrefined carbohydrates for refined ones. The former distorts the natural dietetic pattern of the individual and the natural law of adaptation is broken; in the latter case there is no such distortion and no such law is broken. The quotation from my book reveals this difference.

With regard to Dr. Sinclair's letter (Nov. 15) I will leave your readers to decide whether obesity occurs in wild creatures,

and whether a lesson may be learnt from this, and from their weight in captivity when their food remains the same—a lesson that may be more convincing than all the abstruse academic statements ever uttered on this subject.

I cannot, however, refrain from pointing out the remarkable confusion by Dr. Sinclair between physiological fat in a wild animal and pathological fat in civilised man. Does he attach the same significance to the fat on a whale, for example, which represents a miracle of adaptation to icy waters, as to the degenerative obesity that intrudes into many lives in these islands today? What has the size of a dinosaur got to do with the argument, any more than the size of an elephant?

Gosport, Hampshire. T. L. CLEAVE.

NASAL POLYP CAUSING AN ORAL TUMOUR AND HÆMATEMESIS

SIR,—I should like to describe an unusual case-history.

On Dec. 20, 1957, a boy of six was brought to the casualty department. Apart from a history of nasal catarrh, he had been well until that evening, when he had vomited blood.

He was of normal size and weight, and was not anæmic. There was trismus, and when his mouth was opened a little the whole oral cavity was filled by a red tumour which could be traced back to the region of the left faucial tonsil. There were no other abnormal physical signs.

During examination he produced a small amount of blood which he appeared to have vomited.

He was admitted for observation to the ear, nose, and throat department, and later a large antral polypus, growing from the left side of the nose and presenting in the oropharynx, was removed with postnasal forceps.

Radiological investigations later showed that both frontal sinuses and antra were less translucent than normal, and they were thought to be infected. A further polypus was removed in February, 1958, also from the left side.

I am grateful to Mr. R. W. Smartt for permission to publish this account.

Royal Hospital, Chesterfield. K. A. TAYLOR.

AN AID TO ABDOMINAL EXAMINATION

SIR,—It is the practice in the electrotherapy department of this hospital to carry out a routine methodical palpation of the abdomen of patients when they are anæsthetised and relaxed either before or after the induced convulsion. In the past few months two malignant tumours have been discovered in this way.

A severely depressed patient, at his pretreatment physical examination, was suspected of having some abdominal disease, but clinical and radiological examination was negative. The patient's somewhat vague symptoms were therefore attributed to his generally disturbed mental state, and E.C.T. was begun. While he was relaxed, and before the shock was given, palpation of the abdomen revealed a hard readily palpable mass which unfortunately turned out to be an inoperable carcinoma of the stomach.

In the second case the tumour was found in a patient who had never complained of any symptoms referable to the alimentary tract and who had been carefully examined at various hospitals at least four times during the previous six months.

The technique of relaxing a patient is quick, simple, and safe. 0·5 g. of hexobarbitone intravenously, followed by 40 mg. of suxamethonium chloride when the patient is asleep, relaxes the patient sufficiently to give the clinician ample time to palpate the abdomen carefully and thoroughly without distress to the patient.

The artificial respiration which must be given while the patient is relaxed can be given adequately by a simple Boyle's apparatus, and does not hinder the examination in any way.

Stanley Royd Hospital, Wakefield. DOUGLAS A. KNOX.

CHRISTMAS GIFTS FUND APPEAL

SIR,—I should like to remind your readers who have not yet responded to the President's appeal that it is our custom to distribute the gifts some days before Christmas.

I hope all who can will send their contributions marked "Christmas Gifts" to the Secretary, Royal Medical Benevolent Fund, 1, Balliol House, Manor Fields, Putney, London, S.W.15, as soon as possible.

FRANK JULER
Honorary Treasurer,
Royal Medical Benevolent Fund.

Parliament

Tomorrow's Pensions

THE promise in the Queen's Speech of early legislation on pensions lent added point to the debate in the Commons on Nov. 11 on provision for old age. Though the official motion was based on the recent white-paper on the subject, the discussion not unexpectedly also covered the superannuation scheme put forward some eighteen months ago by the Labour Party.

In his opening speech Mr. JOHN BOYD-CARPENTER, Minister of Pensions and National Insurance, said that the view had been gaining ground that the flat-rate system of contribution was proving inadequate to the needs of the day. The system had two weaknesses: the better-paid could not earn a higher pension than the lower-paid could afford to contribute towards; and the Exchequer contribution had to go equally towards the pensions of those who needed it and those who did not. The growth of occupational pension schemes was steady, but for many years a substantial section of the population would have only their National Insurance pension to look forward to, and graded contributions would give them inside the national scheme an opportunity to earn a higher pension.

Another problem, he added, had been set by the 1946 Act. Under it full pensions were paid to all who had contributed even for a short time. As a result the Exchequer this year would have to find besides its fixed contribution of £125 million an extra £14 million. In three years' time the Exchequer would have to find an extra £150 million, and in twenty years' time an extra £400 million. Not only would this lay a heavy burden on the taxpayer but it would go a long way towards undermining the concept that, since benefits were paid in return for a contribution, they were payable as a right without proof of means.

The Government had therefore taken the view that we should move over to a system of graduated pensions and contributions. It was clear that there must be a minimum contribution to which short-term benefits and the standard rate of pensions could be related. The Government proposed that this flat-rate should be fixed at a joint contribution of 8½% of £9 a week—i.e., 15*s*. 4*d*. a week as against the present contribution of 18*s*. 2*d*. On weekly salaries from £9 to £15 it was proposed that there should be a graded contribution of 8½% of earnings, evenly divided between employer and employee.[1] People earning above £15 a week were not excluded from the scheme but were treated as having earnings at £15. The Government would not compel people to provide through State machinery benefits which they could arrange to provide for themselves, and there would be a system of contracting out of the

1. The white-paper (Cmnd 538) suggests that the graduated weekly joint contribution (which would be additional to minimum flat contribution of 15*s*. 4*d*.) should range from 1*s*. 8*d*. for a salary of £9 to 10*s*. 2*d*. for a salary of £15 or over. The additions to the basic pension which these graded contributions could earn would vary according to the pensioner's salary and his age at entry to the scheme. For men entering the scheme at the age of eighteen they would range from an addition of 6*s*. a week (salary £10) to 41*s*. (salary £15 or more); and for men entering the scheme at fifty from 2*s*. to 13*s*.

graduated portion for members of approved private schemes. There would be an increase of 1/4% a side in the contribution at 1965 and at each of the following quinquennia. He agreed that the white-paper made no provision for immediately raising the existing basic retirement pension, but pointed out that it was a machinery Bill which by its complexity could not come into force until 1961 and was not a proper vehicle for adjusting the rates of benefit. The scheme did not link prices and benefits automatically, but the white-paper explicitly stated that the basic rates should be kept under review. The scheme had been criticised for erring on the side of moderation. If so, he was sure it was a fault on the right side. It was easy to build up and expand schemes if justified; it was extremely difficult to cut them down if we built them too big. He believed that the proposals offered a firm and enduring foundation on which over the years we could build a sound system of provision for old age.

Mr. H. A. MARQUAND criticised the scheme because it lagged behind those introduced in Germany and the United States. The Labour Party remained convinced that by means of contributions proportional to wages and salaries, from employer, employee, and State, more satisfactory provision for pensions could be made.[2] Under the Government's proposals the reduction in the contributions of the lower-paid workers was to be for four years only, and the emerging cost, formerly the liability of the taxpayers, was to be met by a levy on 13 million workers earning more than £9 a week. The heaviest part of the burden was to fall on those earning less than £15 a week.

Nearly a quarter of our retirement pensioners needed National Assistance. That was too many. To give the retirement pensioner another 10*s*. a week would not be more inflationary than the credit given to hire-purchase finance houses. The plan failed to guarantee for the poorest in our community an adequate and decent standard of living.

Health in the Factories

On Nov. 17 Mr. IAIN MACLEOD, the Minister of Labour and National Service, introduced a Bill to " make further provision for the health, safety and welfare of those employed in factories ". Though not a major Bill by the standards of 1901 and 1937, it was, he said, a good deal more than a collection of facts or a " tidying up " measure.

The Factories Acts imposed statutory obligations, for the most part inevitably on employers, to do some things and to refrain from doing others, with the object of establishing by the force of law minimum standards of safety, health, and welfare in industry. This approach over the years had achieved a steady improvement, but he believed that we had probably reached a stage when adding to the law by compelling those concerned in industry to do some things and not to do others —necessary though this was—might not always be the best method. Over the years the advisory work of the factory inspectorate had increased and many industries and such bodies as the British Employers' Confederation and the Trade Union Congress had already set up machinery to deal with safety, health, and welfare. The new Bill proposed to give this voluntary method a firm statutory basis by imposing on the Minister an obligation to collect and disseminate information on these subjects and, in cooperation with industry, to study these problems.

The Bill also gave the Minister power, under certain safeguards, to relax the restrictions on the hours of employment of women and young persons. These restrictions, which had been laid down in the 1937 Act, were in his view too rigid, and in fact they had never been applied in their full rigour, for under a Defence regulation the Minister had been given more or less absolute power to relax them, though this had been sparingly used. His power under the new Bill would be sharply limited and he would, for instance, no longer be able to alter the hours of employment of young people under 16.

The Bill also improved the existing law about fire-fighting and the arrangements for means of escape and fire alarms, and also for the first time dealt with fire prevention.

Speaking in the debate, Mr. L. R. CARR criticised the provisions about first-aid. He had hoped that the Bill would give a greater impetus to the improvement of first-aid work. He felt that a factory of any size at all ought to have a separate surgery or first-aid room. A system of boxes spread throughout a factory, however well kept, however sufficiently supplied, with however many trained workers was insufficient.

Dr. BARNETT STROSS returned to this point. If first-aid was to be useful it must be as good as possible and the Chief Inspector's remarks on first-aid boxes in his 1957 report made sad reading. He wrote of inadequate stocks, dirty dressings, which obviously would bring about infection, and " queer " things in the boxes, such as old bottles of cough linctus. Mr. MACLEOD intervened to say that the provisions of the 1937 Act never worked satisfactorily because there was no definition of what was satisfactory. He intended to have discussions and to make an order to ensure that the standards were fully equal to those laid down by the St. John Ambulance and the Red Cross. Dr. STROSS also asked for an assurance that the list of " dangerous occurrences " requiring notification included an escape of radioactivity. He would like to see regulations to ensure that no person could sell or hire a machine which contained a source of ionising radiation without notifying the chief inspector; that the occupier of a factory should notify the district inspector if he intended to use a radioactive substance; that every case of illness suspected of being due to radioactivity should be notified to the district inspector.

QUESTION TIME

Children's Hospitals

IN the House of Lords on Nov. 13 Lord BALFOUR OF BURLEIGH asked the Government whether it was their policy to act on the unanimous opinions of the report, dated 1957, of the pædiatric committee of the Royal College of Physicians in relation to the care of children in hospital, and, in particular, to have regard to the view of the committee that " there is no doubt that special children's hospitals offer the best service for children, because the staff, at all levels and in all departments, is attuned to the special needs of the sick child ". The Earl of ONSLOW, who replied, said that the Minister of Health fully recognised the merits of special children's hospitals, but did not consider that they should necessarily override all other considerations. He certainly did not rule out the use of children's units in general hospitals, as is also envisaged by the pædiatric committee of the Royal College of Physicians. The right form of provision in a particular area would depend on the circumstances of the area and would be a matter for decision by the hospital board concerned in the first instance.

Lord BALFOUR OF BURLEIGH: Could the Noble Earl give your Lordships an idea of what considerations would lead the Minister to override this unanimous recommendation of the most eminent members of the medical profession?—The Earl of ONSLOW: I think the answer would be that in particular areas where it was more suitable to have a children's ward in an existing hospital that would be the case, and at the same time, of course, the staff looking after the children would be specially trained. I know that one of the considerations that the Minister would take into account is the question of visiting. Probably one of the most important things in the care of children is that the parents should be able to visit them whenever possible, and a small children's hospital in an area which might be accessible to the few but not the many would not really achieve what the noble Lord, I know, wants.

2. The Labour plan, *National Superannuation*, set the objective of half-pay pensions at 65 for the average wage-earner (with a maximum benefit of £750 a year). The employee was to contribute 3% of his earnings, the employer 5% of his workers' earnings, the Exchequer 2% of the total earnings of the community. The plan also proposed a basic pension of £3, which would be tied to a new cost-of-living index.

In the House of Commons on Nov. 17 Mr. ERIC FLETCHER asked the Minister of Health whether he was aware of the feeling that existed among parents and others against the proposal to close Queen Mary's Hospital for Sick Children, Carshalton; and whether he would reconsider the matter.—Mr. DEREK WALKER-SMITH replied: I have received representations from several sources about the proposal to change the use of this hospital, and I will certainly take these and all relevant factors into account before coming to a decision. Mr. FLETCHER: Will the Minister bear in mind that for many years this hospital has enjoyed a deservedly high reputation among parents for its specialised work in dealing with child patients, and that there would be great concern if it were closed and children sent in future to general hospitals?—Mr. WALKER-SMITH: I must make it clear that there is no proposal to close Queen Mary's Hospital. The proposal is concerned merely with a change of use. I accept what the hon. Gentleman says about the high repute of this hospital, but at present it is nearly half-empty because of the very welcome fall in the need for accommodation for children.

Mr. KENNETH ROBINSON: In considering this matter, will the Minister also not forget the desperate need of the Fountain Hospital, which also has a high reputation, for decent, modern, permanent accommodation?—Mr. WALKER-SMITH: I have that very much in mind.

Working Hours of Nurses

Mr. ARTHUR BLENKINSOP asked the Minister of Health (1) whether he would reconsider the terms of his recent circular to hospital authorities in which their attention is drawn to the desirability of introducing shorter working hours for nurses while denying any financial provision that might be required; (2) what progress has been made in implementing shorter working hours for nurses in hospitals.—Mr. WALKER-SMITH replied: I have called for progress reports at the end of this month and will consider the position in the light of the results achieved.—Mr. BLENKINSOP: Do I understand that the Minister is prepared to change his view about financing these schemes?—Mr. WALKER-SMITH: That does not arise at this stage. What I want to do is to see whether we can get a reduction of hours following on an increase of efficiency due to rationalisation rather than to a further expenditure of money.—Mr. BLENKINSOP: Can I take it that the Minister is prepared sympathetically to consider the problems of some hospitals which, for financial reasons, cannot reduce hours without increasing staff?—Mr. WALKER-SMITH: The need for increases in staff and the extent to which that can be achieved within the funds available will be a matter to be considered in the light of that and all other circumstances.

Mrs. B. BRADDOCK: Is not the Minister aware that the difficulty about putting a 44-hour week into operation is largely that in the older hospitals the staffs are under establishment because of the difficulty of recruiting nurses, due to the hard work and the number of steps which have to be climbed in those hospitals? Is he not aware that management committees have been informed that they cannot reduce hours by increasing staff, and that without financial assistance for that the situation is being made even more difficult?—Mr. WALKER-SMITH: I take the hon. Lady's point, but she will appreciate that I shall be able to test its extent and validity when I compare reports from different types of hospitals.

Design of Children's Shoes

The British Boot, Shoe, and Allied Trades Research Association, supported by the Department of Scientific and Industrial Research, has made foot measurements on many thousands of children, in conjunction with the health departments of some local authorities. The data have been analysed, and as a result new and improved lasts for children's shoes have been designed by the Association. If manufacturers of shoes use the lasts, they are able to stamp on the inside of the shoes that they are to that specification. The lasts make no difference to the cost of the shoe.

Diary of the Week

NOV. 23 TO 29

Monday, 24th

MANCHESTER MEDICAL SOCIETY
9 P.M. (Large Anatomy Theatre, University of Manchester.) *General Practice.* Dr. Fred Janus: The Differential Diagnosis and Treatment of Glaucoma.

Tuesday, 25th

BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene and Tropical Medicine, Keppel Street, W.1.) Dr. E. H. Mercer: Electron Microscopy and the Structure of the Living Cell.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8 P.M. *Medicine.* Dr. Alan Jacobs, Dr. David Sutton, Mr. Peter Martin: Peripheral Arterial Disease.

ST. MARY'S HOSPITAL MEDICAL SCHOOL, Paddington, W.2
5 P.M. Mr. W. R. Winterton: Gynæcology of Old Age.

INSTITUTE OF DERMATOLOGY, Lisle Street, W.C.2
5.30 P.M. Dr. E. J. Moynahan: Pigmentation.

INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY
3 P.M. (Hammersmith Hospital, Ducane Road, W.12.) Mr. Leslie Williams: The Obstetrician's Attitude to Radiology.

PLYMOUTH MEDICAL SOCIETY
8.30 P.M. (Freedom Fields.) Dr. Robert Blair, Mr. L. Walrond Innes, Dr. J. Nixon Morris: The National Ill-Health Service.

Wednesday, 26th

POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W.12
2 P.M. Dr. H. M. Sinclair: Essential Fatty Acids.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. B. W. Riddell: Control of Fungous Diseases.

INSTITUTE OF DISEASES OF THE CHEST, Brompton, S.W.3
5 P.M. Dr. N. Lloyd Rusby: Lung Manifestations of the Collagen Diseases.

INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY
4.30 P.M. (Chelsea Hospital for Women, Dovehouse Street, S.W.3.) Mr. Alan Brews: Development Anomalies of the Female Genital Tract and Their Clinical Significance.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Dr. E. W. Gibbs: Food Hygiene in Retail Shops.

BRITISH PSYCHOLOGICAL SOCIETY
8.30 P.M. (1, Wimpole Street, W.1.) *Medical section.* Dr. John Bowlby: Studies of Parent-infant Interaction in Man and Animals.

MANCHESTER MEDICAL SOCIETY
5 P.M. (Medical School, University of Manchester.) *Pathology.* Prof. H. G. Cannon: Lamarck—Fact and Fancy.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS, 242, St. Vincent Street, Glasgow
5 P.M. Sir Russell Brain: Neurology of the Cervical Spine. (Finlayson lecture.)

Thursday, 27th

BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene and Tropical Medicine.) Mr. Michael Abercrombie: Cell Surface and the Control of Growth.

ROYAL SOCIETY OF MEDICINE
5.30 P.M. *Library (Scientific Research.)* Mr. W. J. Bishop, Dr. William McCartney, Dr. R. W. White: What the User Expects of a Medical Library, with special reference to the Needs of the Library Section.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. R. H. Marten: Dermal Allergy.

HONYMAN GILLESPIE LECTURE
5 P.M. (University New Buildings, Teviot Place, Edinburgh.) Dr. Ian Gordon: Rheumatic Syndromes in the Elderly.

UNIVERSITY OF ST. ANDREWS
5 P.M. (Physiology lecture theatre, Dundee.) Prof. L. S. Penrose: Mutation and Selection in Man.

Friday, 28th

POSTGRADUATE MEDICAL SCHOOL
10 A.M. Mr. F. R. Kilpatrick: Partial Nephrectomy.

Appointments

BOTHWELL, P. W., M.B. Aberd., D.P.H.: senior M.O. for epidemiology, Bristol.
GEIRINGER, ERICH, M.D. Lond., PH.D. Edin.: senior research M.O., department of medicine, Otago University, New Zealand.
HIGGINBOTTOM, W. M., L.R.C.P.E., D.O.: ophthalmologist (S.H.M.O.), North and South Tees-side groups of hospitals.
NICHOLAS, P. O., M.B. Brist., D.C.H.: assistant M.O. and school M.O., Castleford, Yorkshire.
REID, ANNA M. M., M.B. Edin., D.P.H.: assistant M.O. (maternity and child welfare), Northumberland.
TOGOOD, SHIRLEY, J., M.B. Lond.: assistant M.O.H., Walsall.
WHITE, J. R., L.R.C.P.I., D.P.H.: assistant M.O.H., Walsall.

Colonial Appointments:

BENETT, G. R., M.B. Lond., F.R.C.S.: assistant surgeon, health department, Mauritius.
BERRIE, J. R. H., M.B. Glasg., D.P.H., D.I.H.: senior M.O. (administrative), Northern Region, Nigeria.
CROUCH, D. R., M.B. Lond.: M.O., Jamaica.
GERBER, J. H., M.D. Berlin: senior M.O. (administrative), Northern Region, Nigeria.
HAWORTH, JAMES, M.B. Edin., D.T.M.&H., D.P.H.: senior M.O., Somaliland.
KENYON, W. L. R., M.B. Manc., M.R.C.P.: specialist officer, health department, Zanzibar.
MILLER, J. R. M., M.B. Lond., F.R.C.S.: surgical specialist, Kenya.
MURRAY, P. C., M.D., M.P.H., D.I.H.: principal M.O., Jamaica.
NAIDOO, S. C., M.B. Madras, B.SC.: M.O., Jamaica.
RAJBULLY, M. A., M.D. Paris: M.O., Mauritius.
SCHMIDT, K. E., M.D. Graz, D.P.M.: specialist alienist, medical department, Sarawak.
YATES, F. W., L.M.S.S.A.: M.O., Northern Region, Nigeria.

Notes and News

INCOMES OF THE PROFESSIONS

THE *Financial Times* has investigated the changes since 1951 in incomes of the professional middle classes; and it reports [1] that in nearly every case the increase in net income, after tax, of a given grade of professional employee has been greater than the rise (amounting to slightly over a quarter) in the cost of living. Professors in the faculty of medicine who are married and have 2 children now receive a net income, on average, 26% above that of 1951. In the case of general practitioners with 2 children the average net increase is given as 23%; and dentists as 39%. The most striking proportional increases in the *Financial Times*' list are those for bank clerks, whose net income has risen by 82% to 55% (minimum and maximum salaries) and for lieut.-colonels (52% and 51%). The increase for the average industrial worker is given as 51%. All these percentages relate to married men with 2 children.

The *Financial Times* concludes that anyone paying income-tax, in order to maintain the purchasing-power of his salary over these seven years, has had to secure an increase in gross income somewhat smaller than the 25% increase in prices; that family men (thanks largely to the increase in children's allowances) have fared better than single men; and that higher-tax payers (thanks mainly to the change in the earned-income allowance) have fared better than low-tax payers. The largest salary earners "are better off to-day than they were seven years ago even if they have received no increase in gross salary during the interval". The general practitioner alone among those listed has achieved an increase in net income of less than the 25% increase in prices; "the long decline in the economic position of the middle classes has been not only halted but partially reversed."

ADAPTATION AND INNOVATION

Princess Margaret presided when the Invalid Children's Aid Association, now 70 years old, held its annual meeting on Nov. 11. Reporting as chairman, Dr. ALFRED WHITE FRANKLIN said that in the social scene, and therefore in social welfare, the key words are change and speed—evolutionary change happening with revolutionary speed. Changes in some of the Association's establishments—for severely handicapped children, for those with speech defects, and for respiratory disorders—illustrate this rapid adaptation: he mentioned two homes in particular which are becoming schools where special treatment is readily available. Of casework he remarked:

> "To do casework is not enough: the casework that we *don't* do has always to be studied . . . The humanitarian impulse is checked and controlled by the intelligence, which ordains that casework must not stop at the material, but must go further in counsel and help, and be constructive. This is the ideal. Let us nevertheless beware of letting our hearts grow hard, so that for fear of not finishing we don't even start. Let us beware of losing sight of charity because the view is blocked by scientific social engineering."

A subcommittee is reporting among other things on how to extend casework into the families of children who are chronically sick or disabled and how to extend casework where mental defect is causing or is likely to cause problems for the normal brothers and sisters, and the integration of personal and family casework between the various voluntary societies. But though it can plan and organise, the Association cannot carry on without money, for which there is still great need.

Sir RUSSELL BRAIN said that the State has assumed a large degree of responsibility for the welfare of every citizen, and there is always likely to be more to be done in the social services associated with health than the State can afford to provide. But by taxation the State has made it harder for the voluntary associations to carry on their work. He believed that there is therefore a good case for asking the State in suitable cases to make grants to voluntary societies.

> "That may sound a little paradoxical, but I don't think it is. The mere fact that there are many associations supported by voluntary contributions means that a good deal of social work which the State itself might like to do is done for it, and if by means of State grants such societies are enabled to flourish and to do more and better work the State is in fact getting the work done much more cheaply than would be the case if it had to pay for it all itself."

But there are other limitations on what the State can do. Its very size is a handicap when it comes to thinking and acting in certain spheres, and history shows how often pioneer social work has been started by a few enthusiasts and developed by voluntary societies, before the State has finally taken it over. One of the valuable functions of the Association is the discovery of fresh needs and opportunities for service to invalid children which are beyond the scope of the State; and one of the great advantages of the voluntary societies is that, because they are voluntary and independent, they have a greater flexibility.

MARRIAGE GUIDANCE

PREVENTIVE measures are less dramatic than emergency repairs. In the long run they are also less expensive, but unfortunately they often seem less urgent and as a result they tend to be neglected until it is too late. An unhappy example of this shortsighted and wasteful policy is to be found in the cost of broken marriages to the community and the thoughtless parsimony of our contribution towards the work of saving breaking marriages. The annual report of the Marriage Guidance Council [1] reminds us that £15¾ million a year is spent on children who are in public care and £1 million a year on legal aid for divorce. Many of the children in approved schools and in hostels, on whom a further £4¾ million a year is spent, also come from broken homes. Almost all these children have been deprived of a stable home background by parental death, illness, or disagreement, and of these three causes parental discord is today the most important. Among marriages where the wives are under 45, and where there are therefore likely to be young children, more homes are disrupted by divorce than by death. Yet less than £35,000 a year is spent on all marriage-guidance work.

The Marriage Guidance Council itself, despite the recommendation of the Royal Commission on Marriage and Divorce, has a Government grant of only £10,000 for 1958–59, and its total income last year was less than £19,000. Many of the 80 local marriage-guidance councils which are spread all over the British Isles receive local-authority grants, but the work is severely handicapped for lack of funds and is still largely dependent on donations and voluntary subscriptions.

It is an advance that fewer parents die young today, thanks largely to the money which has been spent on medical research and on the health services. But more parents might continue to live together if we supported more generously those who are trying to help marriages which have run into difficulties.

UNSUITABLE OCCUPATIONS FOR DIABETICS

WHEN children leave school, their parents may have had no clear guidance about the kinds of work they should or should not do. The medical advisory committee of the British Diabetic Association (152, Harley Street, London, W.1) has drawn up some notes about this which it would like to see incorporated in the last school report of diabetic children.

"The great majority of occupations," it points out, "can safely be undertaken by the young diabetic, and it is therefore easier to consider those which are unsuitable. Regular meals and insulin injections form the basis of good control of diabetes, and occupations in which these cannot reasonably be maintained are unsuitable. This will rule out most forms of shift work, jobs in which the hours of work and meal times are subject to considerable variation, and occupations in which physical exertion is severe and also variable. The other group of occupations unsuitable for diabetics on insulin is that in which the consequences of a hypoglycæmic attack may be serious to themselves or other people. In this category must be included the driving of public transport vehicles, such as

1. *Financial Times*, Nov. 14, 1958.

1. Obtainable from the Council, 78, Duke Street, London, W.1.

trains and buses, signal operating, steeple-jacking, window-cleaning, and occupations connected with dangerous machinery. Diabetics are not accepted by the Fighting Services, and the Merchant Service is not well suited to the requirements of the diabetic.

"These suggestions apply to 'average' diabetics—using the term 'average' to cover both severity of the diabetes and the patient's intelligence and understanding of his condition. There are a number of diabetics engaged in some at least of the occupations listed above and carrying out their duties both safely and successfully."

AN ELECTRONIC COMPUTER

THE mathematics division of the National Physical Laboratory at Teddington is now using a very fast electronic computing machine which is the outcome of research started just after the late war. In 1947 a special section, the control mechanisms and electronics division, was established at the laboratory to develop the automatic computing engine (ACE), the design of which had been evolved by the late Dr. A. M. Turing and his colleagues. A pilot model of relatively small power and capacity was completed in 1951 and did much useful work, including extensive calculations involved in the inquiries into the two disasters to Comet airliners. From this pilot model the commercial 'Deuce' computer was developed. Five years' work with the pilot ACE provided the experience needed to build a second generation of computers, of which the machine lately brought into action at Teddington is a representative.

Computers capable of tackling formidable calculations in hardly any time at all are of particular value, for example, in the aircraft industry, where three-dimensional pressure calculations enter into the design of high-speed planes, and in determining temperature distribution within nuclear reactors. The powers of such a machine depend to a large extent on its capacity to store information and bring it forward rapidly when needed. The new ACE stores the numerical data and instruction sequences with which it is supplied in three ways. The largest store consists of four magnetic drums, designed and built at Teddington, revolving 12,000 times a minute and capable of storing 32,768 numbers. Designers of computers are impatient people and they seem dissatisfied with these drums because it may take up to 7 milliseconds to get at a number stored in them. So the drums are used for the large mass of data which the computer may not want quickly. When it is in more of a hurry it turns to its mercury delay-line store of 768 numbers, where access time is up to 1 millisecond. And finally there are short delay lines storing one, two, or four numbers each, and they are used for those figures which the computer needs to keep in mind for a very short time only.

The operating mechanism of this impressive machine consists of about 6000 miniature electronic valves in ten large cabinets, disposed in a sort of curved colonnade. Within the curve the operator sits at an organ-like control desk, which bears some 160 keys and 300 signal lamps and gives audible and visible signs of how the computation is getting along. ACE can do additions and subtractions at the rate of 30,000 a second, and it can dispatch multiplication sums at 2000 and divisions at 600 a second. In the small matter of obtaining the zeros of a 16th-degree polynomial the machine averages 15 seconds. On the stiffer task of solving Poisson's equation on a square with 400 mesh points it takes about 75 seconds. And that is the sort of performance that makes mathematicians' eyes twinkle. The main application of ACE at present will be to study the general methods by which very fast computations can be carried out.

An exhibition of electronic computers opens in London at Olympia on Nov. 28.

Rockefeller Foundation

The Foundation's grants during the third quarter of 1958 include £24,000 to the library of the Royal Society of Medicine to help it to maintain its work over the next five years while the society is seeking additional endowment funds.

University of Durham

Dr. John T. Ingram, physician in charge of the skin department of the General Infirmary at Leeds and senior clinical lecturer in dermatology in the University of Leeds, has been appointed to the new whole-time chair of dermatology in the University of Durham (see *Lancet*, 1958, i, 253).

Dr. Ingram, who is 59, studied medicine at the London Hospital, qualifying in 1923. After holding appointments at the London Hospital and the Seamen's Hospital, Greenwich, he studied dermatology under the late Dr. Sequeira and worked with the late Dr. MacLeod at St. John's Hospital for Diseases of the Skin. He was the first dermatologist to be appointed to Leeds in 1927 and established a skin department at the General Infirmary at Leeds. He was elected F.R.C.P. in 1936. During the late war he was consultant dermatologist to the British Expeditionary Force, with the rank of colonel. In 1954 he gave the first Watson-Smith lecture to the Royal College of Physicians and in 1956 was the distinguished foreign guest of the American Academy of Dermatology in Chicago. He is a member of many foreign dermatological societies and is joint author of Sequeira's *Diseases of the Skin*, the latest edition of which was published in 1957. Dr. Ingram has been a member of the General Medical Council and of the council of the Royal College of Physicians and is chairman of a committee of the college which is to report on undergraduate and postgraduate education in dermatology. He has been chairman and member of various dermatological committees of the Medical Research Council.

Royal College of Surgeons of England

At a meeting of the council on Nov. 13, with Sir James Paterson Ross, the president, in the chair, the John Hunter medal was presented to Dr. L. W. Proger. Sir Clement Price Thomas was appointed as Tudor Edwards lecturer and Mr. Michael Smyth as Gordon-Watson lecturer.

A diploma of fellowship in the Faculty of Anæsthetists was conferred on Odile M. E. P. Plantevin.

Licences to practise and postgraduate diplomas were conferred on those named in the report of the comitia of the Royal College of Physicians in our issue of Nov. 8 (p. 1024). Licences to practise were also conferred on the following:

E. G. L. Davies, W. E. I. Forsyth-Jauch, Gillian A. Jefferies, Napier Malcolm.

The Elderly in the Community

The Central Council for Health Education is holding a conference on this subject at Tavistock House, London, W.C.1, on Thursday, Jan. 22.

Prof. C. Fraser Brockington will give the opening address and Lord Amulree will take the chair at a discussion on the prevention of handicap due to ageing. Medical speakers will include Dr. C. O. S. Blyth Brooke, Dr. H. D. Chalke, Dr. A. J. Dalzell-Ward, Dr. John DeLargy, Dr. Ridley Gibson, and Dr. J. A. Gillet.

British Medical Students' Association

At the Association's annual dinner, held at the London Hospital Medical College on Nov. 14, Mr. Michael Hall, the vice-president, presented the badge of office to this year's hon. president, Mr. A. M. A. Moore. Mr. Moore, proposing The Association, spoke of this body's gratification at the presence of the Lord Mayor of London. More than 90% of students in Great Britain and Northern Ireland were, he said, members of the Association, which was taking a leading part in international medical-student affairs. Mr. Hall, responding, observed that the Association's responsibilities were growing so fast it was having difficulty in supporting itself.

Medical Practitioners' Handbook.—The 1958 edition of this book will provide the general practitioner with the answer to many of the day-to-day problems of his practice as well as offering him useful general information about the administrative framework of the National Health Service and of the medical profession. Copies may be had from the British Medical Association, B.M.A. House, Tavistock Square, London, W.C.1 (12*s.* 6*d.* net; to members of the B.M.A. 10*s.*; to final-year students and graduates within three months of qualifying 5*s.*).

CORRIGENDUM: *Tuberculosis among the Gurkhas.*—The third sentence of the fourth paragraph of this annotation (Nov. 15, p. 1053) should read: "... chemotherapy for all *Heaf-test positive* infants and children under three years (in the absence of *other* evidence of tuberculosis) ..."

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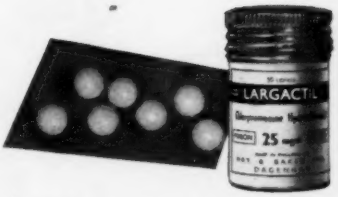

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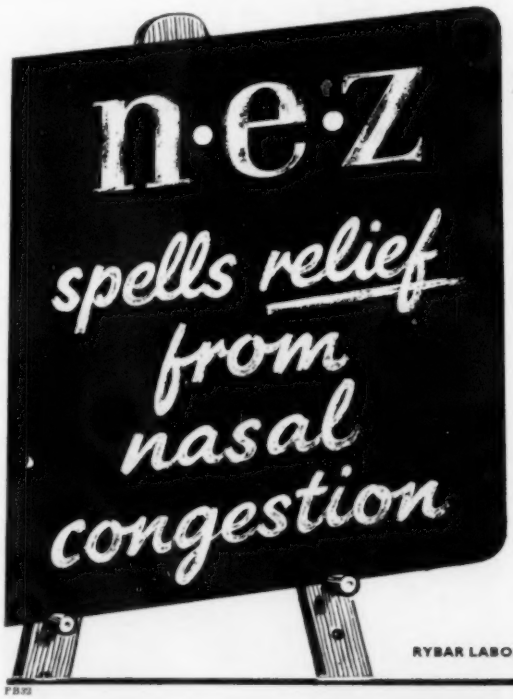

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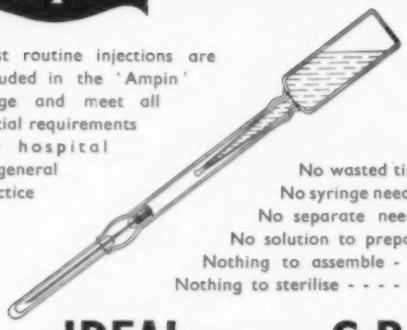

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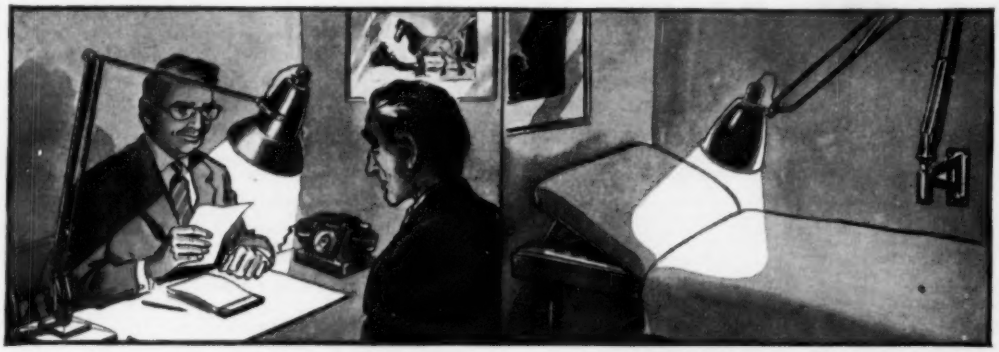

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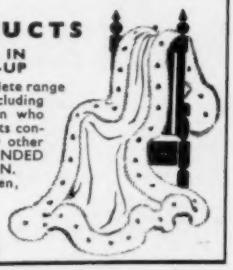

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Academic and Educational

ROYAL COLLEGE OF PHYSICIANS OF LONDON

CONFERENCE ON CLINICAL EFFECTS OF ELECTROLYTE DISTURBANCES

It is proposed to hold at the College a Conference on this subject on 27TH AND 28TH FEBRUARY, 1959. It is primarily arranged for Fellows and Members of the College who are Consultants in Medicine or Pathology. Numbers may have to be limited and application should be made to the Registrar not later than 23rd January, 1959. Entrance fee 5 guineas, which will include lunches and dinner, should accompany applications. The provisional programme is as follows :—

Friday, 27th February

Chairman : Dr. R. PLATT, F.R.C.P.

President's opening remarks.
General Introduction. Methods of Study.
Physiology of Body Fluids (D. A. K. BLACK, Manchester).
Technical Aspects of Electrolyte Study (V. WYNN, London).
Measurement of "Spaces"—Methods and Significance (D. S. MUNRO, Sheffield).
Balance Studies (C. E. DENT, London).
Discussion.
Œdema and its Control.
Mechanisms of Œdema (G. M. BULL, Belfast).
Diuretics (A. G. SPENCER, London).
Chlorothiazide (R. I. S. BAYLISS, London).
Lunch.
Discussion on Œdema and its Treatment.

Chairman : Dr. E. N. ALLOTT

Kidneys and Electrolytes.
Chronic Renal Failure (M. L. ROSENHEIM, London).
Acute Renal Failure (K. G. LOWE, Dundee).
Discussion.
Potassium Depletion (L. P. R. FOURMAN, Cardiff).
Potassium Paresis (B. MCARDLE, London).
Discussion.
Dinner.

Saturday, 28th February

Chairman : Dr. R. A. MCCANCE

Endocrines and Electrolytes.
Introduction (F. T. G. PRUNTY, London).
Aldosterone and Aldosteronism (Potassium-losing Nephritis) (M. D. MILNE, London).
Discussion.
Addison's Disease and Hypopituitarism (E. J. ROSS, London).
Electrolyte Disturbances in Diabetes Mellitus (J. D. N. NABARRO, London).
Diabetes Insipidus and Compulsive Drinking (H. E. DE WARDENER, London).
Discussion.
Lunch.

Chairman : Dr. H. L. MARRIOTT

General Aspects.
Electrolyte Disturbance in Diseases of the Gastrointestinal Tract (C. L. COPE, London).
Electrolyte Disturbances in Heart Failure (O. BRENNER, Birmingham).
Metabolic Response to Trauma and Operation (G. M. WILSON, Sheffield).
Final Discussion.

Pall Mall East, S.W.1. HAROLD BOLDERO, Registrar.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH

KIRK DUNCANSON FELLOWSHIP FOR MEDICAL RESEARCH

The Council of the Royal College of Physicians of Edinburgh will award a Kirk Duncanson Research Fellowship of the value of £800 p.a. for 2 years to commence on 1ST FEBRUARY, 1959.

Applicants, who should state the nature of the proposed research and the place where it is intended to carry it out, must send their applications before 10th January, 1959, to The Secretary, Royal College of Physicians, 9, Queen-street, Edinburgh, 2.

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE

DEPARTMENT OF MEDICAL STATISTICS AND EPIDEMIOLOGY

A COURSE in the Application of Statistical Methods to Medicine and Epidemiology will be held in January to April, 1959 (upon Tuesdays and Thursdays from TUESDAY, 6TH JANUARY to THURSDAY, 30TH APRIL inclusive, from 10 A.M. to 3 P.M.). Students without a medical qualification can be accepted.

Applications for admission must be made to the Registrar, The London School of Hygiene and Tropical Medicine, Keppel-street, W.C.1, before 15th December.

Details of the syllabus of this course can be obtained on request.

Fee for the course 15 guineas.

SOCIETY OF APOTHECARIES OF LONDON

DIPLOMA IN INDUSTRIAL HEALTH

The next Examination will begin on MONDAY, 8TH DECEMBER, 1958. The following Examination will be held in JULY, 1959.

For Regulations apply Registrar, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

UNIVERSITY OF LONDON

POSTGRADUATE MEDICAL SCHOOL

A SYMPOSIUM for Consultant Physicians on Gastroenterology will be held from MONDAY, 13TH APRIL to FRIDAY, 17TH APRIL, 1959, at the Postgraduate Medical School of London, Ducane-road, London, W.12.

The course is limited to 40 Consultant Physicians.

The fee for the 5-day course is £5 (including all refreshments).

Applications should be made by 12th March, 1958, to The Dean, Postgraduate Medical School of London, Ducane-road, London, W.12.

UNIVERSITY OF LONDON

A COURSE OF 2 LECTURES entitled "Substances which Protect Against Ionizing Radiations" will be delivered by Professor Z. M. BACQ (Liège) at 5.30 P.M. on 1ST and 3RD DECEMBER at University College (Physiology Lecture Theatre), Gower-street, W.C.1.

Admission free, without ticket.

JAMES HENDERSON, Academic Registrar.

EMPIRE RHEUMATISM COUNCIL

FELLOWSHIPS—1959

Applications are invited by the Council for the following:

(*a*) A RESEARCH FELLOWSHIP, at a salary according to qualifications and experience of up to £1500 p.a., renewable annually for a period of 3 years, to prosecute research in the field of rheumatism.

(*b*) 2 GEIGY TRAVELLING FELLOWSHIPS, tenable for up to 1 year, to prosecute or study research on some aspect of the Rheumatic Diseases in a country other than that of normal residence. Salary according to qualifications and experience but not less than £1000 p.a. (pro rata for a lesser period than 1 year).

Medical or scientific qualifications are needed for the above Fellowships, and applications stating age, qualifications, experience, and details of proposed research (together with reason for selection of place of study in the case of (*b*) above), should be sent, together with the names of 2 referees, to the General Secretary, Empire Rheumatism Council, Faraday House, 8/10, Charing Cross-road, London, W.C.2, before 15th December, 1958.

ST. BARTHOLOMEW'S HOSPITAL MEDICAL COLLEGE

FINAL F.R.C.S.—MAY, 1959

A COURSE will be held for the above examination on TUESDAY and THURSDAY evenings at 6.30 P.M., starting on TUESDAY, 24TH FEBRUARY, 1959, and ending on THURSDAY, 23RD APRIL, 1959, with a break for Easter.

The course will consist of 16 clinical tutorial classes with short cases, followed by lecture-demonstrations on selected subjects. The course is not comprehensive. The class will be limited to 24 members.

Fee 20 guineas, or to Bart's men 15 guineas.

Entry forms must be obtained from the Sub-Dean, St. Bartholomew's Hospital Medical College, West Smithfield, E.C.1. The closing date for applications is 1st January, 1959.

UNIVERSITY OF EDINBURGH

RESEARCH FELLOWSHIP IN DISORDERS OF CONNECTIVE TISSUE

A Research Fellowship, supported by the Nuffield Foundation, is offered for investigations in the fundamental pathology of disorders of connective tissue. The successful candidate will be expected to work in conjunction with the Department of Pathology and the Rheumatic Research Unit. Salary range, £1100–£1300 p.a., according to qualifications and experience. A medical qualification is desirable, but not essential.

Further particulars from the undersigned

CHARLES H. STEWART, Secretary to the University.

UNIVERSITY OF MANCHESTER

DEPARTMENT OF EDUCATION OF THE DEAF

A COURSE for a limited number of Medical Officers engaged in the public-health service will be held in the Department of Education of the Deaf, the University of Manchester, from 20TH to 23RD JANUARY, 1959, inclusive. Subjects of the course will include the principles and practice of screening tests of hearing, procedures for the assessment of residual capacity to hear in young children and home-guidance to the parents of deaf children.

The fee for the course will be £4 4s.

Applications should be made to the Director, Department of Education of the Deaf, The University, Manchester, 13.

NAPT CANADIAN SCHOLARSHIP 1959/60

This Scholarship Award of £350 is offered to enable a British Chest Physician to study tuberculosis and other chest diseases in Canada for 3 months. Preference will be given to a candidate who has not previously visited Canada or the United States.

Applications to the Secretary-General, NAPT, Tavistock House North, Tavistock-square, London, W.C.1, not later than 31st December, 1958.

SOCIETY OF THORACIC SURGEONS OF GREAT BRITAIN AND IRELAND

EVARTS A. GRAHAM MEMORIAL TRAVELLING FELLOWSHIP

The American Association of Thoracic Surgeons is again kindly offering a Fellowship for the period of 1 year, commencing in OCTOBER, 1959.

Anyone interested should write to me immediately for further particulars. G. H. WOOLER,

Honorary Secretary to the Society of Thoracic Surgeons of Great Britain and Ireland, The General Infirmary at Leeds, Great George-street, Leeds, 1.

UNIVERSITY OF ABERDEEN. Applications are invited for a TERMINABLE LECTURER IN PATHOLOGY. Salary scale £900–£1200 with appropriate placing. F.S.S.U. and child allowance.

Particulars from the Secretary, The University, Aberdeen, with whom applications (2 copies) should be lodged by 6th December, 1958.

THE UNIVERSITY OF SHEFFIELD. Applications are invited for a post of SENIOR LECTURER IN PATHOLOGY to begin duties as soon as possible. Salary scale £1950–£100–£2550, with F.S.S.U. provision and family allowance. The successful applicant may be accorded Honorary Consultant status in the United Sheffield Hospitals.

Further particulars may be obtained from the Registrar to whom applications (12 copies) should be sent by 13th December, 1958.

THE UNIVERSITY OF LIVERPOOL. Department of CHILD HEALTH. Applications are invited for the following posts :—

LECTURER (full-time). Initial salary within the range £1200–£1500 p.a., according to qualifications and experience. The successful candidate will be granted an honorary contract under the Liverpool Regional Hospital Board as Consultant in respect of 3 sessions at Alder Hey Children's Hospital and/or Mill Road Maternity Hospital.

LECTURER (full-time). Initial salary within the range £1200–£1550 p.a. according to qualifications and experience. The duties will include the conduct of clinics for the Local Health Authority. The successful candidate will be granted an honorary contract under the Regional Hospital Board as Consultant in respect of 2 sessions at Alder Hey Children's Hospital and possibly 2 at Mill Road Maternity Hospital, depending upon the experience of the successful applicant. For both posts clinical responsibility and research facilities under the general direction of the Professor of Child Health will be available within the department.

Applications, stating age, academic qualifications and experience, together with the names of 3 referees, should be received not later than 8th December, 1958, by the Registrar, from whom further particulars of the conditions of appointment may be obtained.

THE UNIVERSITY OF MANCHESTER. Applications are invited for a post of RESEARCH ASSISTANT in the Department of Bacteriology. The successful candidate will be required to assist in a programme of work on the immunochemistry of *Bordetella pertussis*. The appointment will be made for 1 year in the first instance, and preference will be given to candidates with a Ph.D. degree and suitable experience in biochemistry and microbiology. Salary £750 p.a.

Applications should be sent not later than 6th December, 1958, to the Registrar, the University, Manchester, 13, from whom further particulars and forms of application may be obtained.

THE UNIVERSITY OF MANCHESTER. Applications are invited for the post of TUTOR IN MEDICINE. Salary £1050 p.a. with membership of Children's Allowance Scheme. The Tutor will be required to give instruction in clinical medicine and supervise the studies of students during their period of clinical apprenticeship. In addition the Tutor will be required to take part in the clinical and research activities of the Department of Medicine. A higher qualification in medicine will be considered an advantage.

Applications should be sent not later than 1st December, 1958, to the Registrar, the University, Manchester, 13, from whom further particulars and forms of application may be obtained.

AUSTRALIA. UNIVERSITY OF ADELAIDE. Senior LECTURER IN PHARMACY. Applications are invited for the above appointment. The successful candidate will be Head of the Department of Pharmacy. A candidate must be a registered pharmaceutical chemist. Salary £A2100–£80–£2500 with superannuation on the F.S.S.U. basis. Copies of the general conditions of appointment and of a statement for the information of candidates may be had on application to the Secretary, Association of Universities of the British Commonwealth, 36, Gordon-square, London, W.C.1, or to the Registrar. Any further information desired will be supplied on request to the Registrar.

Applications, in duplicate and giving the information listed in the statement, should reach the Registrar, The University of Adelaide, Adelaide, South Australia, not later than 15th December, 1958.

UNIVERSITY OF KHARTOUM. Applications are invited for :

LECTURESHIP IN PATHOLOGY.

LECTURESHIP IN OBSTETRICS AND GYNÆCOLOGY.

Salary scale : £S1577–£75–£S2475 p.a., entry-point according to qualifications and experience. Cost-of-living allowance approximately £S180 p.a., outfit allowance £S50. Family allowances: wife £S60 p.a., first child £S90 p.a., second and third children £S30 p.a. each. (£S1=£1 0s. 6d. sterling). Passages for appointee and family on appointment, termination, and annual leave. Superannuation scheme. Initial appointment 5 years, with possible renewal. Unfurnished accommodation provided at rent up to 7½% salary. Candidates for these posts may apply for secondment from the National Health Service for a period of up to 3 years under the terms of circular letter No. RHB (52) 106 BG (52) 101 of 30th September, 1952.

Detailed applications (8 copies), naming 3 referees, by 29th December, 1958, to Secretary, Inter-University Council for Higher Education Overseas, 29, Woburn-square, London, W.C.1, from whom further information may be obtained.

UNIVERSITY OF WESTERN AUSTRALIA. Applications are invited for the position of SENIOR ASSISTANT in the Department of Child Health in the University of Western Australia. A senior qualification in medicine, and teaching and research experience in a University Department of Pædiatrics or Child Health are essential. The salary range for the Senior Assistant in Child Health will be £A3000–£A3200 p.a., with superannuation similar to F.S.S.U. Commencing salary will depend on the qualifications and experience of the successful applicant. Conditions of appointment and information concerning (*a*) academic appointments in general and (*b*) the Medical School and the above position in particular are obtainable from the Secretary, Association of Universities of the British Commonwealth, 36, Gordon-square, London, W.C.1.

Applications close, in Australia and London, on 9th January, 1959.

Hospital Services: Senior Appointments

ROYAL FREE HOSPITAL. Applications are invited from registered medical practitioners for the appointment of CONSULTANT SURGEON to the E.N.T. Department for 3 sessions per week (not 2 sessions as indicated in the previous advertisement).

In view of this amendment applications will be accepted up to 29th November, 1958.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Applications are invited for the post of Whole-time CONSULTANT RADIOTHERAPIST. The appointment will start as from 1st April, 1959. Candidates may visit the department by arrangement with the Director.

Applications, stating age and giving full details of qualifications and experience, together with the names of 3 referees, to reach the Secretary, Board of Governors, The Hammersmith, West London, and St. Mark's Hospitals, Ducane-road, London, W.12, by 20th December, 1958.

NORTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD.

CONSULTANT PSYCHIATRIST, 5 half-days a week, Child Guidance Training Centre, 6, Osnaburgh-street, N.W.1. Further particulars may be obtained from the Medical Director of the Centre, which may be visited by direct appointment.

Applications before 29th December, 1958.

Royal London Homœopathic Hospital, Great Ormond-street, W.C.1 (183 Beds)

A vacancy for a SENIOR HOSPITAL MEDICAL OFFICER, 2 half-days a week, exists on the Medical Staff of this Hospital. Candidates should be Fellows or Members of the Faculty of Homœopathy. Hospital may be visited by direct appointment.

Applications before 19th December, 1958.

Application forms obtainable from and returnable to Secretary, North West Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, W.2.

ROYAL NATIONAL THROAT, NOSE AND EAR HOS-PITAL, Gray's Inn-road, W.C.1, and Golden-square, W.1. The Board of Governors invites applications for a post of ASSISTANT RADIOLOGIST (Consultant grading) for attendance on 2 sessions weekly, the actual times of which will be arranged. Applicants should have had considerable experience in the radiology of this specialty and should preferably hold a Diploma in Radiology.

Applications, which should give full details of age, qualifications, experience, and posts held, should be sent in triplicate to the House Governor by 10th January, 1959.

SOUTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD requires Part-time CONSULTANT ORTHOPÆDIC SURGEON (3 half-days per week) for the Battersea and Putney Group of hospitals. Duties mainly at Battersea General Hospital.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, W.2, by 20th December, 1958. Applicants may visit Hospital by local arrangement.

ST. JAMES' HOSPITAL, Balham, London, S.W.12. Locum SENIOR CASUALTY OFFICER (Senior Hospital Medical Officer grade) required from 16th February to 10th May, 1959.

Applications to Group Secretary at above address by 16th December, giving full details, including age, and names of 2 referees.

ST. THOMAS'S HOSPITAL, London, S.E.1. Applications are invited for the post of Part-time PHYSICIAN with full Consultant status and membership of the Medical Committee. 4 half-day sessions per week.

Applications (12 copies), naming 3 referees, to Clerk of the Governors by 20th December, 1958.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. Applications are invited for the post of CONSULTANT NEUROSURGEON attending 6 to 8 sessions per week. Applicants should be Fellows of the Royal College of Surgeons of England.

Further particulars and form of application which must be returned not later than 15th December, 1958, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

BIRMINGHAM REGIONAL HOSPITAL BOARD. Whole-time SENIOR CASUALTY OFFICER, Worcester Royal Infirmary. Salary within scale £1653–£2126 p.a. Tenable for 4 years. Higher qualification an advantage.

Applications (15 copies), stating age, qualifications, nationality, present and previous appointments, and details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, by 22nd December.

LEEDS REGIONAL HOSPITAL BOARD. Consultant in Dentistry (8 notional half-days per week) at hospitals in the Bradford and Wakefield areas. Applicants should have a higher dental qualification and be experienced in maxillo-facial work. The successful candidate will be required to reside in the Bradford area.

Applications (12 copies), stating age, qualifications, and details of present and previous appointments, with dates, and names and addresses of 3 referees, to the Secretary, Park Parade, Harrogate, by 9th December, 1958.

LIVERPOOL REGIONAL HOSPITAL BOARD. Applications are invited for the post of Part-time CONSULTANT ANÆSTHETIST giving 8 notional half-days mainly in the Southport Group with some duties in the North Liverpool Group. Candidates must have had at least 5 years' recognised training and experience in anæsthesia and must be Fellows of the Faculty of Anæsthetists.

Forms of application from Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 55, Castle-street, Liverpool, 2, to be returned not later than 13th December, 1958.

VINCENT COLLINGE, Secretary to the Board.

MANCHESTER REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT ASSISTANT RADIOTHERAPIST (Senior Hospital Medical Officer), Christie Hospital and Holt Radium Institute, Manchester. F.F.R. or other higher qualification desirable ; appointee to live in or near Manchester.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by 3rd December, 1958.

MANCHESTER. UNITED MANCHESTER HOSPITALS. Applications are invited for 2 posts of CONSULTANT SURGEON at the Manchester Royal Infirmary, each for 8 sessions a week. The successful candidates will be expected to spend an appropriate time in research in addition to clinical and teaching duties.

Applications (12 copies), with the names of 3 referees, should be sent to the undersigned not later than 13th December, 1958, from whom further particulars may be obtained.

A. B. SCOTT, Secretary to the Board of Governors.

United Manchester Hospitals, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. Applications are invited for a post of CONSULTANT OBSTETRICIAN AND GYNÆCOLOGIST to commence on 20th August, 1959, with 8 sessions a week at St. Mary's Hospitals. The successful applicant, in addition to his clinical duties, will be expected to engage in the clinical instruction of undergraduate and postgraduate medical students and to undertake research in obstetrics and gynæcology.

Applications (12 copies), with the names of 3 referees, should be sent to the undersigned not later than 13th December, 1958.

A. B. SCOTT, Secretary to the Board of Governors.

United Manchester Hospitals, Manchester, 13.

NORTH GLOUCESTERSHIRE CLINICAL AREA. South WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of a Whole-time CONSULTANT PSYCHIATRIST at Horton Road and Coney Hill Hospitals, Gloucester, but with duties mainly in the Child Guidance Service; in addition, the successful candidate will be required to visit other hospitals in the clinical area as determined by the Regional Board. Applicants must possess a higher qualification and have had experience in child psychiatry.

Applications (12 copies), stating date of birth, qualifications, and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 13th December, 1958.

NORTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD. BEDFORD GENERAL HOSPITAL. (424 Beds.) Locum Tenens ORTHOPÆDIC SURGEON of Consultant, Senior Hospital Medical Officer, or Senior Registrar status required immediately for up to 7 sessions weekly. Probable duration 3 months. Remuneration according to status.

Apply to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford. Telephone 5401, Extension 22.

ROCHFORD GENERAL HOSPITAL. Locum Geriatric PHYSICIAN required at the above Hospital for a period of approximately 1 to 3 months, commencing from 24th November.

Applications to the Secretary at the above Hospital as soon as possible.

SHEFFIELD REGIONAL HOSPITAL BOARD. 2 Con-SULTANT PHYSICIANS (maximum part-time) required, with duties at hospitals in the Derby area.

Application form and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 13th December, 1958.

SOUTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD requires Part-time CONSULTANT OBSTETRICIAN AND GYNÆCOLOGIST (7 half-days per week) for the Epsom Group. Duties mainly at Epsom District Hospital. Successful candidate will be required to reside within the area served by the Group.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, W.2, by 20th December, 1958. Applicants may visit Hospital by local arrangement.

WELSH REGIONAL HOSPITAL BOARD. Consultant RADIOLOGIST, North Monmouthshire Hospital Management Committee. Based Ebbw Vale Hospital with visits to other hospitals in North Monmouthshire and neighbouring Groups. Optional whole-time/maximum part-time appointment.

Applications (12 copies), naming 3 referees, to Senior Administrative Medical Officer, Welsh Regional Hospital Board, Temple of Peace, Cathays Park, Cardiff, within 21 days.

WEST INDIES. UNIVERSITY COLLEGE HOSPITAL OF THE WEST INDIES. The Board of Management invites applications for the appointment of SENIOR CONSULTANT ANÆSTHETIST to be in charge of the Anæsthetic Department at the above Teaching Hospital which is in the course of expansion from 300 to 450 Beds. Candidates must have had wide experience of anæsthetics and be in possession of the F.F.A. R.C.S. There are ample opportunities in this appointment for research in anæsthesia. The salary for the appointment will be £2300 p.a. together with an allowance at present at the rate of £250 p.a. from the University College in respect of teaching duties, and there are opportunities for limited consultant practice. A contract will be offered for 3 years in the first instance, subject to renewal, and passages will be provided for the successful candidate and his family on appointment and on termination of contract. The Board is prepared to consider a secondment for a shorter term if a suitable applicant wishes for such an arrangement. Unfurnished accommodation will be provided for which a rental of 5% of salary will be charged. The appointment is full-time, and the holder of the post will be required to contribute 5% of his salary to the Hospital's superannuation scheme.

Applications (6 copies), stating full details of qualifications, present appointment and previous experience, together with the names and addresses of 3 referees, should be sent not later than 29th December, 1958, to the Secretary of the Senate Committee of College Overseas in Special Relation, University of London, Senate House, London, W.C.1, from whom further information may be obtained.

SCOTLAND. SOUTH-EASTERN REGIONAL HOS-PITAL BOARD. CONSULTANT SURGEON, 2 sessions per week, at the Deaconess Hospital, Edinburgh (28 surgical beds).

Apply, giving particulars of age, qualifications and previous experience, and the names of 3 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 20th December, 1958.

SCOTLAND. SOUTH-EASTERN REGIONAL HOS-PITAL BOARD. CONSULTANT PHYSICIAN, 5 sessions per week, at Leith Hospital, Edinburgh (42 general medical beds).

Apply, giving particulars of age, qualifications and previous experience, and the names of 3 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 20th December, 1958.

SCOTLAND. SOUTH-EASTERN REGIONAL HOS-PITAL BOARD. Whole-time appointment of ANÆSTHETIST (Senior Hospital Medical Officer grade) for duty in the hospitals in the eastern half of the County of Fife, based on Kirkcaldy General Hospital.

Apply, giving particulars of age, qualifications and previous experience, and the names of 3 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 13th December, 1958.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of ASSISTANT OPHTHALMOLOGIST based at the Glasgow Ophthalmic Institution, with duties in the Glasgow and Lanarkshire School Clinics. The appointment will be whole-time or on the maximum part-time basis of 9 notional half-days per week. Salary (at age 32 and over) on the scale £1653 15s.–£52 10s.–£2126 5s.

Applications (16 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, not later than 30 days after the publication of this advertisement.

Hospital Services: Junior Appointments

BETHNAL GREEN HOSPITAL, Cambridge Heath-road, London, E.2. 3 HOUSE PHYSICIANS, pre-registration posts.

Apply immediately, stating experience, with copies of 2 testimonials, to Hospital Secretary.

BROMPTON HOSPITAL, S.W.3. Applications are invited for the following posts:

NON-RESIDENT SURGICAL OFFICER (post graded as Senior House Officer or Registrar, according to qualifications and experience) for 6 months from 1st February, 1959, with eligibility for reappointment. Candidates must have held a resident hospital appointment.

RESIDENT HOUSE PHYSICIAN (3 vacancies).

2 vacancies for 6 months from 1st February, 1959. Duties include work in Outpatient Department and wards. 1 of the successful candidates will also be required to undertake duties in E.N.T. Department.

1 vacancy for 9 months from 1st February, 1959. The first 3 months at Brompton Hospital Sanatorium, Frimley, and the following 6 months at the Hospital in London covering work in Outpatient Department and wards. Salary at the rate of £577 10s. p.a.

RESIDENT HOUSE PHYSICIAN to the Cardiac Department for 6 months from 1st March, 1959. Duties include work in Outpatient Department and wards. Salary at the rate of £577 10s. p.a.

Applications, stating age, qualifications, with dates, nationality, and appointments held, together with copies of testimonials, by 6th December, 1958, to KENNETH A. F. MILES, House Governor.

BROMPTON HOSPITAL, S.W.3. Applications invited for the post of Temporary SURGICAL REGISTRAR (whole-time). Salary within the Registrar grade. Appointment is for 1 year, and candidates must hold the diploma of F.R.C.S.

Applications, stating age, qualifications, with dates, nationality, and appointments held, together with copies of testimonials, by 6th December, 1958, to KENNETH A. F. MILES, House Governor.

CONNAUGHT HOSPITAL, Walthamstow, E.17. Locum SURGICAL REGISTRAR required from 27th November, 1958.

Apply Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

GROUP LABORATORY, Mile End Hospital, Bancroft-road, London, E.1. RESIDENT ASSISTANT PATHOLOGIST (Senior House Officer grade). Previous experience an advantage but not essential. Laboratory recognised for Diploma of Pathology and is well equipped with excellent training facilities. Post vacant 12th January, 1959.

Applications, stating age, nationality, qualifications, experience and copies of not more than 3 testimonials, to the Secretary, Stepney Group Hospital Management Committee, Mile End Hospital, Bancroft-road, E.1.

GUY'S HOSPITAL, S.E.1. Applications are invited for the post of REGISTRAR (mid-grade) in the Department of Ophthalmology, with attendance on 2 sessions per week. Duties will commence as soon as possible until 30th September, 1959, in the first instance.

Forms of application are obtainable from, and should be lodged with, the Superintendent, Guy's Hospital, London Bridge, S.E.1, not later than 27th November, 1958.

GUY'S HOSPITAL, S.E.1. Applications are invited for the post of REGISTRAR in the Radiotherapy Department; duties to commence as soon as possible. The post will be tenable until 30th September, 1959, in the first instance. Higher qualifications would be an advantage, but there would be opportunities for studying for the D.M.R.T. Parts I and II.

Forms of application are obtainable from, and should be lodged with, the Superintendent, Guy's Hospital, London Bridge, S.E.1, not later than 27th November, 1958.

GUY'S HOSPITAL, S.E.1. Applications are invited for the post of SENIOR REGISTRAR in the Department of Neurology with duties from 1st January, 1959, until 30th September, 1959, in the first instance.

Forms of application are obtainable from, and should be lodged with, the Superintendent, Guy's Hospital, London Bridge, S.E.1, not later than 27th November, 1958.

HAMMERSMITH HOSPITAL AND INSTITUTES OF OBSTETRICS AND CHILD HEALTH, Ducane-road, London, W.12. RESIDENT PÆDIATRIC REGISTRAR required. Post vacant 1st February, 1959. Duties involve care of newly born babies in Maternity Department and Premature Baby Unit.

Detailed applications, names 2 referees, to Secretary, Board of Governors, Hammersmith Hospital, Ducane-road, W.12, by 29th November.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. 2 RESIDENT HOUSE SURGEONS (radiotherapy) required 1st January. These posts offer opportunities for attending general surgical postgraduate teaching.

Detailed applications, copies 2 recent testimonials, to Secretary, Board of Governors, The Hammersmith, West London and St. Mark's Hospitals, Ducane-road, London, W.12, immediately.

HAMPSTEAD GENERAL HOSPITAL, Haverstock Hill, N.W.3. (ROYAL FREE HOSPITAL GROUP.) Applications are invited for the pre-registration post of NON-RESIDENT CASUALTY OFFICER (medical or surgical). Vacant 1st January, 1959, tenable for a period of 6 months.

Application forms may be obtained from the Secretary, to whom they should be returned, together with copies of 3 recent testimonials, by 4th December, 1958.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, London, N.21. HOUSE SURGEON for Gynæcological and General Surgery.

Applications, with copies of 3 testimonials and name and address of 1 referee, to Hospital Secretary.

KING EDWARD MEMORIAL HOSPITAL, Ealing, W.13. SENIOR HOUSE OFFICER (anæsthetics) for duties at King Edward Memorial Hospital and associate hospitals. Resident. Vacant 8th January. Resident Registrar employed. Post recognised for D.A. and F.F.A. R.C.S. examinations.

Apply, stating age, nationality, qualifications and experience, with copies of up to 3 recent testimonials, to Group Secretary, South West Middlesex Hospital Management Committee, West Middlesex Hospital, Isleworth, by 1st December, 1958.

KING EDWARD MEMORIAL HOSPITAL, Ealing, W.13. HOUSE OFFICER in Gynæcology at above Hospital. Vacant 1st December. Pre-registration surgical post. Preference given to persons seeking second pre-registration post under the Medical Act, 1950. If services satisfactory will subsequently be considered for recognised obstetric post at Perivale Maternity Hospital, Greenford.

Applications, stating age, nationality, qualifications and experience with copies of 2 recent testimonials, to Group Secretary, South West Middlesex Hospital Management Committee, West Middlesex Hospital, Isleworth, by 1st December, 1958.

KING'S COLLEGE HOSPITAL, Denmark Hill, S.E.5. Applications are invited for the appointment of SENIOR RESIDENT MEDICAL OFFICER at the Belgrave Hospital for Children, to be filled as soon as possible. The appointment is for 1 year in the first instance and will be in the grade of Registrar.

Applications, stating age, education, qualifications and experience, together with the names of 2 referees, should be sent to the undersigned by 6th December, 1958.

S. W. BARNES, House Governor.

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of SENIOR HOUSE OFFICER to Surgical Outpatients Department, becoming vacant on 1st January, 1959.

Applications (6 copies), together with 6 copies of 3 recent testimonials, should be received by the undersigned by 10th December, 1958. H. BRIERLEY, House Governor.

MEMORIAL HOSPITAL, Shooters Hill, Woolwich, S.E.18. HOUSE SURGEONS. 2 posts vacant 1st January. Approved for pre-registration purposes and recognised for F.R.C.S.

Apply to Secretary.

MILE END HOSPITAL, Bancroft-road, London, E.1. (479 Beds.) (Obstetric beds 69, gynæcological beds 31.) SENIOR HOUSE OFFICER (obstetrics and gynæcology). Post vacant 12th December, 1958. Recognised for D.Obst.R.C.O.G.

Application forms, obtainable from Physician-Superintendent, to be returned by 5th December, 1958, with copies of not more than 3 testimonials.

MILE END HOSPITAL, Bancroft-road, London, E.1. (479 Beds.) HOUSE SURGEON (pre- or post-registration). Post vacant immediately.

Application forms, obtainable from Physician-Superintendent, to be returned by 5th December, 1958, with copies of not more than 3 testimonials.

NATIONAL HEART HOSPITAL, Maids Moreton, BUCKINGHAM. (Country Branch of the National Heart Hospital.) Applications are invited for the post of RESIDENT MEDICAL OFFICER at the Hospital's country branch. The appointment is for a period of 6 months from 1st January, 1959, but may be renewed for a further period not exceeding 6 months. The status of the post is that of a Senior House Officer and the salary is in accordance with the terms and conditions of service. The holder will be expected to attend on 1 day weekly at the Hospital in Westmoreland-street.

Applications, with copies of 3 recent testimonials, should be sent to me at Westmoreland-street, London, W.1, not later than 5th December, 1958.

ROBERT G. E. WHITNEY, Secretary to the Board.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited for the post of RESIDENT MEDICAL OFFICER at Maida Vale Hospital for Nervous Diseases, London, W.9. Appointment in the first instance for 6 months, renewable. Grading as Registrar. Preference will be given to candidates holding a higher degree, and previous neurological experience will be an asset.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary at Maida Vale Hospital not later than 6th December, 1958.

NELSON HOSPITAL, Kingston-road, Merton, S.W.20. (123 Beds.) HOUSE SURGEON (resident, approved for pre-registration service). Post vacant end November.

Applications, stating age, qualifications, &c., and the names and addresses of 2 referees, to the Secretary at above address.

NORTH EAST METROPOLITAN REGIONAL HOS-PITAL BOARD.

SENIOR PSYCHIATRIC REGISTRAR required under joint training scheme, initially at Severalls Hospital, Colchester (resident or non-resident—house available), then at St. Bartholomew's Hospital, E.C.1.

King George Hospital, Ilford, Essex

SURGICAL REGISTRAR with duties in Casualty and Orthopædic Departments. Resident or non-resident. Recognised for F.R.C.S.

Connaught Hospital, E.17

SURGICAL REGISTRAR with duties in Casualty and Orthopædic Departments. Resident. Recognised for F.R.C.S.

Herts and Essex General Hospital, Bishop's Stortford

ANÆSTHETIC REGISTRAR. Resident. Recognised for F.F.A. R.C.S.

Essex County Hospital, Colchester

MEDICAL REGISTRAR. Resident or non-resident.

Warley Hospital, Brentwood, Essex

PSYCHIATRIC REGISTRAR. Resident or non-resident, married or single accommodation available. Recognised for D.P.M.

Appointments subject to review after 1 year.

Application forms from Secretary, 40, Eastbourne-terrace, W.2, to be returned by 6th December.

NORTH MIDDLESEX HOSPITAL, London, N.18. Applications are invited from pre-registration and registered medical practitioners for 4 posts of RESIDENT HOUSE SURGEON. 6-month appointments. Vacant beginning of January, 1959. All posts recognised for F.R.C.S.

Applications, stating age, qualifications, experience, with copies of testimonials, to Secretary of Hospital, by 26th November.

NORTH MIDDLESEX HOSPITAL, London, N.18. Applications are invited for the post of RESIDENT HOUSE PHYSICIAN (general medicine). 6-month appointment, starting 1st January, 1959. Approved pre-registration post (first or second).

Applications, stating age, qualifications, experience, with copies of testimonials, to Secretary of Hospital, by 26th November.

NORTH MIDDLESEX HOSPITAL, London, N.18. Locum REGISTRAR in Obstetrics and Gynæcology required 1st December for indefinite period. Non-resident. Busy department. Further details on request.

Applications, with full particulars and copies of testimonials or names of referees, to Secretary of Hospital.

NORTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD. Whole-time REGISTRAR in Physical Medicine, jointly at Royal Northern Hospital, Holloway, N.7, and Highlands General Hospital, Winchmore Hill, N.21. Hospitals may be visited by direct appointment.

Application forms obtainable from and returnable to Group Secretary, Royal Northern Hospital, Holloway-road, N.7, by 5th December, 1958.

NORTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD and THE BOARD OF GOVERNORS OF THE ROYAL FREE HOSPITAL. Applications are invited for the post of SENIOR REGISTRAR in Medicine. During the first 2 years the successful candidate will be appointed to Hillingdon Hospital, Middlesex (General—621 Beds), and during the second 2 years to the Royal Free Hospital (983 Beds). Candidates should have had wide experience in general medicine. Hospitals may be visited by direct appointment.

Application forms from and returnable to Group Secretary, Uxbridge Group Hospital Management Committee, The Furze, Pield Heath-road, Hillingdon, Middlesex, by 3rd December.

PADDINGTON GENERAL HOSPITAL, Harrow-road, W.9. Applications are invited now for the post of ORTHOPÆDIC AND CASUALTY HOUSE OFFICER in busy and modern Casualty Department.

Applications, stating age, experience and qualifications, with names and addresses of 2 referees, to be forwarded immediately to Hospital Secretary.

POPLAR HOSPITAL, East India Dock-road, E.14. Temporary SURGICAL REGISTRAR required at above Hospital from 19th December, 1958. Candidates should possess the F.R.C.S. qualification.

Apply Hospital Secretary immediately (telephone: EAST 1876).

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. Applications are invited for the appointment of RESIDENT SENIOR CASUALTY OFFICER (Senior House Officer) recognised for F.R.C.S. examination, to the above Hospital for a period of 6 months, vacant 15th January, 1959.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15, to be returned by 6th December, 1958.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. Applications are invited for the appointment of RESIDENT JUNIOR HOUSE PHYSICIAN (pre-registration first or second post) to the above Hospital for a period of 6 months, vacant 15th January, 1959.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15, to be returned by 6th December, 1958.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. Applications are invited for the appointment of RESIDENT JUNIOR HOUSE PHYSICIAN (pre-registration first or second post) to the above Hospital for a period of 6 months, vacant 6th January, 1959.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15, to be returned by 6th December, 1958.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. Applications are invited for the appointment of RESIDENT SENIOR HOUSE SURGEON (Senior House Officer) to the above Hospital for a period of 6 months, vacant 15th January, 1959.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15, to be returned by 6th December, 1958.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. Applications are invited for the appointment of RESIDENT JUNIOR HOUSE SURGEON (pre-registration first or second post) to the above Hospital for a period of 6 months, vacant 15th January, 1959.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15, to be returned by 6th December, 1958.

PUTNEY HOSPITAL, Lower Common, Putney, S.W.15. HOUSE SURGEON, resident. Vacant 15th December, 1958. Open to registered practitioners and pre-registration candidates.

Apply Hospital Secretary, enclosing copies of 3 recent testimonials, by 27th November, 1958.

PUTNEY HOSPITAL, Lower Common, S.W.15. House PHYSICIAN (resident), Male or Female. Vacant 23rd December, 1958. Open to pre-registration candidates.

Apply Hospital Secretary, enclosing copies of 3 recent testimonials, by 3rd December, 1958.

REGIONAL NEUROSURGICAL CENTRE. (66 Beds.) BROOK GENERAL HOSPITAL, Shooters Hill-road, S.E.18. SENIOR HOUSE OFFICER (neurosurgery). Vacant 1st December. Post recognised for F.R.C.S. and D.P.M., and provides excellent opportunity for training in neurology.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ROYAL FREE HOSPITAL GROUP. Applications are invited from registered Women medical practitioners for 2 resident posts of REGISTRAR in Gynæcology and Obstetrics :—

1. To work at Elizabeth Garrett Anderson Hospital from 1st December, 1958.
2. To work at Elizabeth Garrett Anderson and Hampstead General Hospitals, from 1st January, 1959.

Appointments for 1 year in the first instance.

Application forms may be obtained from the Secretary to the Board of Governors, The Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned as soon as possible.

ROYAL FREE HOSPITAL, Gray's Inn-road, W.C.1. Applications are invited from registered medical practitioners for the post of ORTHOPÆDIC REGISTRAR (non-resident) from 1st January, 1959. This post will provide experience for 1 year at the Royal Free Hospital and 1 year at Heatherwood Orthopædic Hospital which is a Regional Orthopædic Centre.

Application forms may be obtained from the Secretary to the Board of Governors at the above address, to whom they should be returned as soon as possible.

ROYAL FREE HOSPITAL, Gray's Inn-road, W.C.1. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER to the Radiotherapy Department. Applicants should be registered medical practitioners, and the appointment is suitable for a candidate doing a postgraduate course in radiotherapy. The appointment is for 1 year in the first instance. Duties to commence on 1st January, 1959.

Application forms may be obtained from the Secretary to the Board of Governors, to whom they should be returned as soon as possible.

ST. ANN'S GENERAL HOSPITAL, N.15. Applications are invited for the appointment of RESIDENT HOUSE PHYSICIAN (Senior House Officer) to above Hospital, for duty in the Infectious Diseases Unit and other general duties, for a period of 6 months from 5th December, 1958.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15, to be returned by 29th November, 1958.

ST. CHARLES' HOSPITAL, Ladbroke-grove, W.10. (576 Beds.) Applications are invited for the post of Whole-time REGISTRAR (Thoracic Surgery Unit). Experience in general surgery and thoracic surgery essential, and higher surgical qualifications an advantage. Hospital may be visited by direct appointment.

Application forms obtainable from and returnable to the Secretary, Paddington Group Hospital Management Committee, Harrow-road, W.9, by 5th December, 1958.

ST. JAMES' HOSPITAL, Balham, London, S.W.12. HOUSE PHYSICIAN required 2nd December.

Applications, stating age, qualifications and experience, with copies of 2 testimonials, to Group Secretary, Wandsworth Hospital Group, at above address immediately.

ST. NICHOLAS HOSPITAL, Plumstead, S.E.18. House SURGEONS. Vacant 1st January. Recognised for F.R.C.S. and approved for pre-registration service.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ST. OLAVE'S HOSPITAL, Lower-road, Rotherhithe, S.E.16. BERMONDSEY AND SOUTHWARK GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (orthopædics and general surgery) required at above Hospital. Salary £819 10s. p.a. less appropriate deduction for board and lodging. The appointment is tenable for 6 months, is renewable, and may be either fully resident or resident only when on duty.

Applications, stating age, qualifications and experience, together with the names of 3 referees, or copy testimonials, to Hospital Secretary at above address within 1 week of the advertisement.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy in January, 1959, for an ASSISTANT MEDICAL REGISTRAR (Registrar grade), with duties in the Departments of Physical Medicine and Neurology.

Further particulars and application form, to be returned by 8th December, obtainable from the House Governor.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. The office of RESIDENT ASSISTANT SURGEON (Senior Registrar grade) will be vacant in January, 1959.

Further particulars, and application forms, which must be returned by 8th December, may be obtained from the House Governor.

UNIVERSITY COLLEGE HOSPITAL, Gower-street, London, W.C.1. HOSPITAL FOR TROPICAL DISEASES, N.W.1. Applications are invited for the following appointments :—

SENIOR REGISTRAR for 1 year in the first instance from 1st January, 1959, or as soon as possible thereafter.

RESIDENT REGISTRAR for 6 months from 10th January, 1959, renewable.

Applications for the above appointments, with names of 2 referees, to T. F. W. MacKeown, Administrator and Secretary, University College Hospital, by 5th December, 1958.

WHITTINGTON HOSPITAL, London, N.19. Clinical ASSISTANT (General Practitioner) required at Whittington Hospital to assist in Skin Outpatient Clinic 2 hours weekly (Monday morning).

Application forms obtainable from Group Secretary, 46, Cholmeley Park, N.6 (ARC. 3070, extension 527), and returnable to the Medical Superintendent, Whittington Hospital, London, N.19, by 1st December, 1958.

WHITTINGTON HOSPITAL, London, N.19. Applications are invited for the post of SENIOR HOUSE OFFICER (anæsthetics). Resident. Vacant 1st January, 1959. Post recognised for F.F.A. R.C.S. and D.A.

Application forms obtainable from Group Secretary, 46, Cholmeley Park, London, N.6 (ARC. 3070, extension 527), and returnable to the Medical Superintendent, Whittington Hospital, London, N.19, by 1st December, 1958.

WHITTINGTON HOSPITAL, London, N.19. Applications are invited for the following appointments :—

*HOUSE PHYSICIAN (general medicine). 3 posts recognised for M.D. (Lond.).

HOUSE PHYSICIAN (general medicine). Recognised for M.D. (Lond.).

†HOUSE SURGEON (general surgery). 4 posts recognised for F.R.C.S. (Lond.).

HOUSE SURGEON (obstetrics). Post recognised for M.R.C.O.G. in obstetrics.

*HOUSE PHYSICIAN (paediatrics). Post recognised for M.D. (Lond.) and D.C.H.

SENIOR HOUSE OFFICER (Chest Unit).

SENIOR HOUSE OFFICER (anæsthetics). Post recognised for F.F.A. R.C.S. and D.A.

SENIOR HOUSE OFFICER (general medicine). Post recognised for M.D. (Lond.).

SENIOR HOUSE OFFICER (geriatrics).

CLINICAL ASSISTANT (General Practitioner).

All posts vacant 1st January, 1959.

*Pre-registration candidates who have already held a first appointment may apply.

†Pre-registration candidates may apply.

Application forms obtainable from Group Secretary, 46, Cholmeley Park, London, N.6 (ARCHway 3070, extension 527), and returnable to the Medical Superintendent, Whittington Hospital, London, N.19, by 1st December, 1958.

WILLESDEN GENERAL HOSPITAL, Harlesden-road, N.W.10. RESIDENT CASUALTY OFFICER (Senior House Officer) wanted 12th December. Post recognised for fellowship.

Applications, with names of 2 referees, to Hospital Secretary by 3rd December

WILLESDEN GENERAL HOSPITAL, Harlesden-road, London, N.W.10. MEDICAL REGISTRAR (non-resident) required. Post vacant 8th December. Hospital may be visited by direct appointment.

Application forms from and returnable to Group Secretary, Central Middlesex Group Hospital Management Committee, Acton-lane, Park Royal, N.W.10, by 29th November, 1958.

WIMBLEDON HOSPITAL, Thurstan-road, Copse Hill, S.W.20. (82 Beds.) RESIDENT HOUSE SURGEON (not pre-registration). Post vacant 25th November. Salary £577 10s. Post affords good opportunity for postgraduate training and offers excellent experience in surgery.

Applications, giving age, qualifications, &c., and names and addresses of 2 referees, to the Secretary at above address.

WOOLWICH GROUP HOSPITAL MANAGEMENT COM-MITTEE. HOUSE PHYSICIANS. 6 appointments vacant 1st January. 3 at Brook General Hospital, Woolwich, and 3 at St. Nicholas Hospital, Plumstead. All posts approved for pre-registration service.

Applications to Group Secretary, Memorial Hospital, Woolwich, S.E.18, not later than 3rd December.

ABERYSTWYTH, CARDIGANSHIRE. GENERAL HOS-PITAL. MID-WALES HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (surgical) required (resident). Post recognised for F.R.C.S. examination. Vacancy immediate.

Applications, stating age, experience, &c., to the Group Secretary, Mid-Wales Hospital Management Committee, 31, North-parade, Aberystwyth, Cardiganshire.

ACCRINGTON. VICTORIA HOSPITAL. (114 Beds.) HOUSE SURGEON required immediately. Post recognised for F.R.C.S. and approved for pre-registration purposes.

Applications to Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

ALTON GROUP HOSPITAL MANAGEMENT COM-MITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR in Surgery (Registrar grade) required for the Alton General Hospital (136 Beds) with duties as required at the Henry Ganvain Hospital (112 beds), Alton. Vacant mid-February, 1959. The post is non-resident.

Forms of application, obtainable from the Group Secretary, Lord Mayor Treloar Orthopædic Hospital, Alton, Hants, must be completed and returned by 10th December, 1958.

ABERDEEN GENERAL HOSPITALS BOARD OF MANAGEMENT. Applications are invited for the post of REGISTRAR in General Medicine at the Aberdeen Royal Infirmary, with duties in other hospitals. The post is a whole-time one, and the salary and conditions of service are in accordance with the terms issued by the Department of Health for Scotland.

Applications, giving details of qualifications and experience, with the names of 2 referees, should be lodged with the Group Secretary and Treasurer, Aberdeen General Hospitals, P.O. Box 92, 62, Queen's-road, Aberdeen, by Friday, 12th December, 1958.

ARLESEY, BEDFORDSHIRE. THREE COUNTIES HOSPITAL. NORTH WEST METROPOLITAN REGIONAL HOSPITAL AREA. Applications are invited for the post of SENIOR HOUSE OFFICER at the above Mental Hospital of 1300 Beds for work in the Hospital and Outpatient Clinics. Resident or non-resident. The Hospital is recognised for the D.P.M., and facilities will be given for taking this examination.

Application, with 2 recent testimonials, should be addressed to the Medical Superintendent as soon as possible.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (paediatrics) required at Ashton-under-Lyne General Hospital. Neonatal experience would be especially valuable. Modern paediatric and premature baby units. Recognised for D.C.H. Appointment limited to 4 years.

HOUSE OFFICER (paediatrics) also required.

Applications, with copies of 2 references, to Group Secretary, General Hospital, Ashton-under-Lyne, Lancs.

AYLESBURY, BUCKINGHAMSHIRE. TINDAL GENERAL HOSPITAL. HOUSE SURGEON (E.N.T.) (Male or Female). The Department has a high turnover and 4 outpatient clinics weekly. Recognised for D.L.O. and F.R.C.S. No casualty department. Pre-registration post, but registered practitioners invited to apply.

Apply, with copies of 2 testimonials, to Administrative Officer.

AYLESBURY. TINDAL GENERAL HOSPITAL. House PHYSICIAN (Chest Unit), Male or Female. Pre-registration post, but registered practitioners invited to apply. Vacant 24th December, 1958. Duties include care of about 25 chest cases (including tuberculosis chalets) and 4 clinics weekly, including refills, forming a progressive chest unit for the Aylesbury area. Instruction in bronchoscopy and bronchography given. An acute geriatric unit (27 Beds) and a medical outpatient clinic give general medical experience. No Casualty Department.

Apply, with 2 testimonials, to the Administrative Officer.

BARNSTAPLE. NORTH DEVON INFIRMARY. (105 Beds.) HOUSE PHYSICIAN (pre-registration) required immediately.

Applications, naming 2 referees, to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

BEBINGTON, WIRRAL, CHESHIRE. CLATTERBRIDGE HOSPITAL. CENTRAL WIRRAL GROUP. SENIOR HOUSE OFFICER (anaesthetics) required to fill vacancy for a 12-month period. Salary in accordance with current terms and conditions of service.

Application forms, obtainable from Secretary, to be returned immediately.

BEDFORD GENERAL HOSPITAL. (424 Beds.) House SURGEON required. Pre- or post-registration, recognised for F.R.C.S. Post offers exceptional opportunities for general experience in busy acute surgical units. Holder of this appointment will be favourably considered for appointment as House Physician at the termination of contract.

Applications, with copies of 2 recent testimonials, to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BEDFORD GENERAL HOSPITAL. (424 Beds.) North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. GENERAL SURGICAL REGISTRAR (resident) required at above Hospital.

Application forms obtainable from and returnable to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford, by 8th December.

BEDFORD GENERAL HOSPITAL. (424 Beds.) 2 resident Pre-registration HOUSE PHYSICIANS required end November.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford, by 24th November.

BEDFORD GENERAL HOSPITAL. (424 Beds.) Resident SENIOR HOUSE OFFICER (obstetrics and gynæcology). Vacant 28th January, 1959. Post recognised for D.Obst.R.C.O.G. The Maternity Unit comprises 71 obstetric and 23 gynæcological beds and the Hospital has a busy Outpatient Department.

Detailed applications, with copies of 2 recent testimonials, to Group Secretary, Bedford Group Hospital Management Committee, Kimbolton-road, Bedford, by 6th December.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. Applications are invited for the post of REGISTRAR in Radiotherapy (non-resident Registrar grade) for duties in the Radiotherapy Departments of the United Birmingham Hospitals. Candidates should, if possible, hold additional qualifications in medicine, surgery, gynæcology, or physics, or a Diploma in Radiotherapy.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Edgbaston, Birmingham, 15, and should be returned by 6th December, 1958.

BIRMINGHAM ACCIDENT HOSPITAL AND REHABILITATION CENTRE, Bath-row, BIRMINGHAM, 15. SENIOR HOUSE SURGEON, 2 vacancies mid-December. Hospital is the largest traumatic unit in the country, treating 50,000 new patients a year, including 2000 burns. Ample opportunity for practical experience in all types of injury. Recognised for casualty training by Royal College of Surgeons.

Applications, naming 2 referees, to Administrator.

BIRMINGHAM ACCIDENT HOSPITAL, Bath-row, BIRMINGHAM, 15. (215 Beds and 8 House Surgeons.) HOUSE SURGEONS (resident) required from December onwards. Hospital treats over 50,000 injured patients each year, and is recognised for purpose of casualty training by R.C.S. (Eng.). 6-month appointment, part of which may be spent in 42-bedded segregated Burns Unit.

Apply, naming 2 referees, to Administrator.

BIRMINGHAM, 18. DUDLEY ROAD HOSPITAL. Registrar (obstetrics and gynæcology). Resident. 425 maternity and 60 gynæcological beds. M.R.C.O.G. desirable.

Application forms from Group Secretary, to be returned by 1st December, 1958.

BIRMINGHAM, 9. LITTLE BROMWICH GENERAL HOSPITAL. PÆDIATRIC HOUSE PHYSICIAN (Male or Female). Post vacant February, 1959. Recognised for D.C.H. Includes duties on infectious diseases wards, Neonatal Department, and clinics.

Applications to Physician-Superintendent by 24th December, 1958.

BIRMINGHAM. MOSELEY HALL HOSPITAL FOR CHILDREN, Alcester-road, BIRMINGHAM, 13. (65 Beds.) SENIOR HOUSE OFFICER (pædiatric). Vacant now. Resident/non-resident. Recognised for D.C.H.

Apply, with 3 testimonials, within 10 days, to Secretary, Birmingham (Selly Oak) Hospital Management Committee, Oak Tree-lane, Birmingham, 29.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(*a*) Whole-time SENIOR REGISTRAR in Ophthalmology. North Staffordshire Royal Infirmary. Wide experience specialty essential. Higher qualification desirable.

(*b*) Whole-time SENIOR REGISTRAR in Ophthalmology. Birmingham and Midland Eye Hospital. Wide experience specialty essential. Higher qualification an advantage.

Application forms from Secretary, 10, Augustus-road, Birmingham, 15, to be returned by 8th December.

BISHOP AUCKLAND, Co. DURHAM. THE GENERAL HOSPITAL. (350 Beds.) HOUSE PHYSICIAN required. Fully registered or provisionally registered practitioner.

Apply, naming 2 referees, to K. G. T. LUXFORD, Group Secretary, South West Durham Hospital Management Committee, at the above address.

BISHOP'S STORTFORD AND DISTRICT HOSPITAL, Rye-street, BISHOP'S STORTFORD, HERTFORDSHIRE. (67 Beds—medical, surgical, and maternity.) Applications are invited from registered medical practitioners for the post of RESIDENT SENIOR HOUSE OFFICER (Male). Salary £819 10s. p.a., less £150 for residential emoluments. To commence 12th December, 1958.

Applications, stating age, nationality, qualifications and experience, with copies of recent testimonials or names of referees, to Hospital Secretary, Herts and Essex General Hospital, Bishop's Stortford, Herts.

BLACKPOOL VICTORIA HOSPITAL. Blackpool and FYLDE HOSPITAL MANAGEMENT COMMITTEE. MANCHESTER REGIONAL HOSPITAL BOARD. Applications are invited for the post of REGISTRAR in the Department of Diagnostic Radiology at the above Hospital which is recognised for the D.M.R.D. Part II. The post offers wide experience in all aspects of the work of a busy hospital group, including thoracic surgery, the Hospital being the Centre for this specialty for the northern part of the Manchester Region.

The Department may be visited by arrangement with the Group Secretary, Victoria Hospital, Blackpool, to whom applications, stating age, qualifications, experience, and the names and addresses of 2 referees, should be sent.

BOLTON. THE ROYAL INFIRMARY. (246 Beds.) Senior HOUSE OFFICER (resident or non-resident) for Casualty Department, with some orthopaedic duties. Tenable for 12 months and recognised for F.R.C.S. Staff of 2 with Consultant supervision and adequate relief. Post offers good casualty/accident experience.

Applications, stating age, nationality, qualifications, experience, and the names of 2 referees, to Group Secretary, Bolton and District Hospital Management Committee, The Royal Infirmary, Bolton.

BOSTON GENERAL HOSPITAL (80 Beds)/LONDON ROAD HOSPITAL, BOSTON (81 Beds). SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT SURGICAL REGISTRAR required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 1st December, 1958, giving age, nationality, qualifications, present and previous appointments, with dates, naming 3 referees.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of HOUSE SURGEON (general surgery). The post, which becomes vacant at the beginning of December, is recognised for the F.R.C.S. examination and for pre-registration purposes.

Applications to the Hospital Secretary.

BRADFORD CHILDREN'S HOSPITAL, Yorkshire. Senior HOUSE OFFICER (Male or Female), vacant 9th December, 1958. Recognised for D.C.H.

Applications, stating age, nationality, qualifications and experience with copy testimonials, to Secretary, Bradford Royal Infirmary, Bradford, Yorks.

BRENTWOOD. REGIONAL BLOOD TRANSFUSION CENTRE. JUNIOR HOSPITAL MEDICAL OFFICER, full-time, required to take charge of mobile blood collecting team, operating in Essex, Herts, and East London. Opportunity is given to study blood transfusion serology in laboratories. Salary £852 10s.–£55–£1182 10s.

Applications, with names of 2 referees and details of previous experience, to Director, Regional Blood Transfusion Centre, Crescent-drive, Brentwood, Essex.

BRIGHTON GENERAL HOSPITAL. Applications are invited for the appointment of HOUSE PHYSICIAN to the Medical Unit. This is a pre-registration appointment, vacant January, 1959. Salary in accordance with national scales.

Applications, enclosing recent testimonials, and stating age, qualifications, experience, and giving the names of 2 referees, should be sent to the Physician-Superintendent, Brighton General Hospital, Elm-grove, Brighton, 7.

BRIGHTON. ROYAL ALEXANDRA HOSPITAL FOR SICK CHILDREN, Dyke-road, BRIGHTON. (130 Beds.) BRIGHTON AND LEWES HOSPITAL MANAGEMENT COMMITTEE. Vacancy for HOUSE SURGEON for 6 months from 7th January, 1959. The post offers wide experience in pædiatrics and is recognised for D.C.H. Open to pre-registration candidates.

Applications, stating age, nationality, qualifications and experience, together with copies of recent testimonials, to be sent to the Administrative Officer.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (314 Beds.) SENIOR CASUALTY OFFICER (Junior Hospital Medical Officer grade) required for busy Casualty Department (2 junior medical staff). Recognised for F.R.C.S.

Applications, stating age, qualifications and experience, together with the names of 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (314 Beds.) CASUALTY HOUSE SURGEON required end December. Full and varied experience in busy Casualty Department (staff of 3), and also duties in Orthopædic and Traumatic Unit, including charge of beds. Recognised for pre-registration and F.R.C.S.

Applications, stating age, qualifications, experience, and naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRISTOL. COSSHAM AND FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. FRENCHAY HOSPITAL. SENIOR HOUSE OFFICER, Regional Department of Neurosurgery. Vacant immediately, tenable for 6–12 months. The post offers useful surgical experience and the opportunity of gaining a working knowledge of neurological diagnosis. Recognised for F.R.C.S.

Applications to Group Secretary, Frenchay Hospital, quoting "N.S.F." Names of 2 referees required.

BURNLEY AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE, BURNLEY GENERAL HOSPITAL (650 Beds), REEDYFORD MEMORIAL HOSPITAL, NELSON (95 Beds). RESIDENT HOUSE OFFICERS (surgical). The appointments are approved as pre-registration posts and recognised for F.R.C.S. Subject to satisfactory service, the successful applicants will be favourably considered for appointment as House Physicians at the termination of contract as Surgical House Officer.

Applications, with 2 references, to Group Secretary, Burnley General Hospital.

BURNLEY AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (orthopædics and casualty). For Group of hospitals. Resident or non-resident. Period of contract to be arranged. Hours 9 A.M.–6 P.M. 5½ day week. Post now vacant.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to Group Secretary, Burnley and District Hospital Management Committee, Burnley General Hospital.

BURTON-ON-TRENT GENERAL HOSPITAL. (251 Beds.) ANÆSTHETIST (Junior Hospital Medical Officer grade). Busy general base hospital for area. 8 residents. Excellent experience. Recognised for D.A. Married or single accommodation, furnished or unfurnished, as required.

Applications to Group Secretary, General Hospital, Burton-on-Trent, Staffordshire.

BURTON-ON-TRENT GENERAL HOSPITAL. (251 Beds.) CASUALTY OFFICER (Senior House Officer grade). Busy general base hospital for area. 8 residents. Full Consultant service. Excellent experience. Recognised for F.R.C.S. Married accommodation, furnished or unfurnished, available.

Applications to Group Secretary, General Hospital, Burton-on-Trent, Staffordshire.

BURTON-ON-TRENT GENERAL HOSPITAL. (251 Beds.) HOUSE SURGEONS (general), pre-registration. Busy general base hospital for area. 8 residents. Full Consultant service. Excellent experience. Recognised for F.R.C.S. Married accommodation will be available for a joint post.

Applications to Group Secretary, General Hospital, Burton-on-Trent, Staffordshire.

BURTON-ON-TRENT. THE GENERAL HOSPITAL. HOUSE OFFICER (orthopædics) (pre-registration post) required at the above Hospital. Recognised for F.R.C.S.

Applications to Group Secretary as soon as possible.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER in Anæsthetics. The applicant appointed will have duties at hospitals in the above Group, but will be based at Bury General Hospital. The post, which is recognised for the examinations of the D.A., falls vacant on 31st December, 1958.

Apply, stating full details, and names of 2 referees, to H. WILKINSON, Group Secretary.

BURY ST. EDMUNDS. WEST SUFFOLK GENERAL HOSPITAL. (262 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required for Casualty duties. Salary £852 10s.–£55–£1182 10s. a year, less £170 a year for resident single persons. Senior House Officer also employed.

Inquiries and applications to Hospital Secretary.

CASTLEFORD, NORMANTON AND DISTRICT HOSPITAL, HIGHTOWN, CASTLEFORD. RESIDENT CASUALTY OFFICER (Senior House Officer grade) required. Furnished house available.

Apply immediately to the Secretary, Pontefract and Castleford Hospital Management Committee, Great Northern House, Salter Row, Pontefract, Yorkshire.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) E.N.T. and Eye Departments. SENIOR HOUSE OFFICER. Salary £819 10s. p.a. Post vacant January, 1959. Approved for F.R.C.S. and special diplomas.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. (733 Beds.) SENIOR HOUSE OFFICER to the Obstetric and Gynæcological Department (75 obstetric and 60 gynæcological beds). Post vacant 1st January, 1959. Appointment for 6 months, with possibility of renewal for further 6 months. Previous obstetric experience essential. Post recognised for both obstetrics and gynæcology for the M.R.C.O.G.

Applications, giving age, qualifications, experience, and names of 2 referees, together with recent testimonials, to the Group Secretary at above address immediately.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. (733 Beds.) OBSTETRIC HOUSE SURGEON to the Obstetric and Gynæcological Department (135 Beds). Approved pre-registration post. Recognised for M.R.C.O.G. Vacant 31st December.

Applications, stating age, experience and qualifications, with copies of recent testimonials, and names of 2 referees, should be sent to the Secretary at above address immediately.

CHELMSFORD AND ESSEX HOSPITAL. (161 Beds.) Applications are invited for the post of RESIDENT HOUSE SURGEON. Pre-registration post. The post will become vacant at the end of November, and offers good surgical experience. Recognised for the F.R.C.S.

Applications, together with 2 recent testimonials, to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELMSFORD AND ESSEX HOSPITAL. (161 Beds.) Applications are invited for the post of RESIDENT HOUSE PHYSICIAN, pre-registration post, to work in the general medical wards of the Hospital. Duties will commence on 13th December.

Applications, together with 2 recent testimonials, to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELMSFORD. ST. JOHN'S HOSPITAL. Applications are invited from registered practitioners for the post of RESIDENT PÆDIATRIC HOUSE OFFICER (Male or Female), commencing 23rd December, 1958, to work in the Pædiatric Unit of the Chelmsford Hospital Group. The Unit includes a Premature Baby Nursery of 10 cots and a Neonatal Department in the maternity block of the Hospital. The department is recognised for the D.C.H.

Applications, stating age, nationality, qualifications and experience, together with recent testimonials, should be forwarded not later than 2nd December to the Group Secretary, Chelmsford Group Hospital Management Committee, Chelmsford and Essex Hospital, London-road, Chelmsford, Essex.

CHELTENHAM GROUP HOSPITAL MANAGEMENT COMMITTEE. Rotating Internship. A vacancy occurs for a HOUSE SURGEON, pre- or post-registration, at the Cheltenham General Hospital. The successful candidate on completion of his 6 months will be offered the post of House Physician, followed by that of Resident Obstetric Officer in the Group, if desired.

Applications, stating age and experience and names of 2 referees, to be sent to the Group Secretary, General Hospital, Cheltenham.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botley's Park War Hospital). (430 Beds.) ORTHOPÆDIC HOUSE SURGEON (Senior House Officer or House Officer (intern) grade). 100 orthopædic beds. Post recognised for F.R.C.S. and pre-registration service. Salary in accordance with terms and conditions of National Health Service. Post vacant 26th November, 1958.

Applications, together with names and addresses of referees, to be sent to the Physician-Superintendent, St. Peter's Hospital, Chertsey, Surrey.

COLCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for :—

Essex County Hospital, Colchester, Essex (181 Beds)

Post of SENIOR HOUSE OFFICER to Casualty and Radiotherapy Departments. Tenable for 6 months or 1 year. Recognised for F.R.C.S.

Black Notley Hospital, Braintree, Essex (522 Beds)

Post of HOUSE OFFICER (orthopædic surgery). Duties include care of cases from London Hospital Orthopædic Department. Pre-registration or third post, tenable for 6 months. Recognised for F.R.C.S.

Applications, with copies of 3 testimonials, to Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

COLWYN BAY AND WEST DENBIGHSHIRE HOSPITAL, COLWYN BAY. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER to the above Hospital of 60 Beds. The Hospital caters for major surgical, orthopædic and medical cases, and there is a small children's ward. Consultants in these specialties visit daily. A comfortably self-contained furnished flat is available. The post offers excellent experience for a suitably qualified candidate (married or single) who is contemplating entering general practice. The post will be vacant on 1st January, 1959.

Applications, with recent testimonials, should be addressed to William Roberts, Esq., Group Secretary, Clwyd and Deeside Hospital Management Committee, Rhianfa, Russell-road, Rhyl.

CREWE AND DISTRICT MEMORIAL HOSPITAL. (140 Beds.) Applications are invited for the vacant post of SENIOR HOUSE OFFICER in Surgery, which is recognised for the F.R.C.S. examinations. New twin operating-theatres and a new Casualty Department were opened recently. There are 7 residents, and there is ample opportunity for gaining experience in operative surgery and for study.

Please apply to the Group Secretary, Barony Hospital, Nantwich, Cheshire, within 10 days.

CREWE AND DISTRICT MEMORIAL HOSPITAL. (140 Beds.) Applications are invited for the post of Locum SENIOR HOUSE OFFICER in Surgery.

Apply immediately to the Hospital Secretary.

COVENTRY AND WARWICKSHIRE HOSPITAL, COVENTRY. ASSISTANT PATHOLOGIST (Junior Hospital Medical Officer status) required for duties mainly at Group Laboratory. Recognised D.Path. Good opportunity for experience in all branches of specialty.

Applications with full details, and names of 2 referees, to Group Secretary, Coventry and Warwickshire Hospital, Coventry.

DERBY. DERBYSHIRE CHILDREN'S HOSPITAL. (86 Beds.) Applications are invited for the post of HOUSE OFFICER or SENIOR HOUSE OFFICER (paediatrics), vacant 1st January, 1959, tenable for 6 months. Duties mainly surgical but include some medicine. Post recognised for D.C.H. and is open to pre-registration graduates.

Applications, with names of 2 referees, to be sent as soon as possible to Secretary.

DERBY. DERBYSHIRE ROYAL INFIRMARY (416 Beds) AND DERBYSHIRE CHILDREN'S HOSPITAL (86 Beds), SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT REGISTRAR (dermatology) required 1st January. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 1st December, 1958, giving age, nationality, qualifications, present and previous appointments, with dates, naming 3 referees.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds.) HOUSE SURGEON (pre-registration) or SENIOR HOUSE OFFICER (general surgery). Resident. 2 vacancies December. Recognised F.R.C.S. if held by Senior House Officer.

Apply, giving full details and 2 names for reference, to Secretary.

DERBY. DERBYSHIRE ROYAL INFIRMARY (416 Beds), DERBY CITY HOSPITAL (260 Beds). (Post recognised for training for D.A. and F.F.A. R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (anæsthetics) required immediately for the above Hospitals. Duties also at other hospitals in the Group. This post offers special experience in neuro and orthopædic surgery and obstetrics. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 1st December, 1958, giving age, nationality, qualifications, present and previous appointments, with dates, naming 3 referees.

DEWSBURY, YORKSHIRE. STAINCLIFFE GENERAL HOSPITAL. (304 Beds.) Applications are invited for the post of RESIDENT SURGICAL OFFICER (Senior House Officer grade) which becomes vacant on 14th January, 1959. The Surgical Unit comprises 52 Beds for general surgery, and the Hospital is recognised for the F.R.C.S.

Applications, giving full details, should be sent to the Administrative Officer at the Hospital.

DEWSBURY, YORKSHIRE. STAINCLIFFE GENERAL HOSPITAL. (304 Beds.) The pre-registration appointment of HOUSE OFFICER (general surgery) falls vacant on 3rd January, 1959.

Applications, with full details, should be sent to the Administrative Officer at the Hospital.

DEWSBURY, YORKSHIRE. STAINCLIFFE GENERAL HOSPITAL. (304 Beds.) Applications are invited for the appointment of RESIDENT MEDICAL OFFICER (Junior Hospital Medical Officer grade) which becomes vacant on 1st January, 1959. The post is tenable for 1 year in the first instance. The Hospital has an Acute Medical Unit of 70 Beds with 23 paediatric beds in addition and is recognised for the D.C.H. There are 6 other resident medical staff, including 2 House Physicians.

Applications, giving full details, and the names of 3 referees, should be addressed to the Administrative Officer at the Hospital as soon as possible.

DEWSBURY, YORKSHIRE. THE GENERAL HOSPITAL. (128 Beds.) Applications are invited for the pre-registration post of HOUSE PHYSICIAN (general medicine and dermatology) which becomes vacant at the end of December.

Applications, giving full details, should be sent to the Administrative Officer at the Hospital.

DORCHESTER. DORSET COUNTY HOSPITAL. House SURGEON (Male or Female) required for resident, pre-registration post now vacant. Recognised for F.R.C.S. examination and tenable for 6 months.

Applications, stating age, qualifications, together with copy testimonials, to Group Secretary, West Dorset Hospital Management Committee, Damers-road, Dorchester, Dorset, immediately.

DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL GROUP, BIRMINGHAM REGION.

The Guest Hospital, Dudley (154 Beds)

SENIOR HOUSE OFFICER (anæsthetics). Post recognised for F.F.A. R.C.S. and D.A. Successful candidate will be required to visit other hospitals in the Group.

Applications, giving the names of 2 referees, to the Group Secretary, Guest Hospital, Dudley, Worcs.

HOUSE OFFICER (surgical), pre-registration. Post vacant now.

Wordsley Hospital, near Stourbridge (478 Beds)

HOUSE OFFICER (surgical), pre-registration. Post now vacant.

Apply Group Secretary, Guest Hospital, Dudley, Worcs.

DONCASTER ROYAL INFIRMARY. (330 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST in the grade of Senior House Officer. Post recognised under the regulations for the F.F.A. R.C.S. and D.A.

Applications, with copies of 2 recent testimonials, to the Group Secretary, Doncaster Hospital Management Committee, at Doncaster Royal Infirmary.

DONCASTER ROYAL INFIRMARY. (330 Beds.) Applications are invited for the post of HOUSE SURGEON (Intern or Senior House Officer). Post recognised for F.R.C.S.

Applications, with particulars of experience and copies of 2 recent testimonials, to the Group Secretary, Doncaster Hospital Management Committee, at Doncaster Royal Infirmary.

DOUGLAS. NOBLE'S ISLE OF MAN HOSPITAL. (160 Beds.) Applications are invited for pre-registration post of HOUSE SURGEON. Salary in accordance with Whitley scale. 4 residents on staff. Post vacant mid-January.

Apply to the Secretary, Noble's Hospital, Douglas, Isle of Man.

EAST ANGLIAN REGIONAL HOSPITAL BOARD.

ANÆSTHETIC REGISTRAR, West Suffolk General Hospital, Bury St. Edmunds (262 Beds). Recognised for D.A. and F.F.A.R.C.S. Furnished flat available. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary at the Hospital.

REGISTRAR in E.N.T. Surgery, Norfolk and Norwich Hospital and Jenny Lind Children's Hospital, Norwich. Recognised for D.L.O. and F.R.C.S. Candidates invited to visit Hospitals by direct arrangement with Hospital Management Committee Secretary, Norfolk and Norwich Hospital.

ORTHOPÆDIC REGISTRAR, King's Lynn Hospital Group. Main hospitals, West Norfolk and King's Lynn General and St. James', King's Lynn. Possibility of accommodation being available for married candidate. Candidates invited to visit hospitals by direct arrangement with Hospital Management Committee Secretary, St. James' Hospital, King's Lynn.

ORTHOPÆDIC REGISTRAR, Norfolk and Norwich Hospital, Norwich (441 Beds). Post recognised for F.R.C.S. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary at the Hospital.

SURGICAL REGISTRAR, County Hospital, Doddington, Cambridgeshire (116 Beds). Self-contained flat available. Candidates invited to visit Hospital by direct arrangement with the Surgeon-Superintendent.

SURGICAL REGISTRAR, North Cambridgeshire Hospital, Wisbech, Cambridgeshire. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary at the Hospital.

The last 2 appointments provide good training and experience in general and orthopædic surgery.

All appointments for 1 year, renewable for second year.

Applications, stating age, experience, and the names of 3 referees, to Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 8th December, 1958.

EBBW VALE HOSPITAL. (General beds 71, maternity 15.) Applications are invited for the appointment of RESIDENT SURGICAL OFFICER (Junior Hospital Medical Officer grade). The Hospital is an active Surgical Unit, and the Medical staff consists of a Resident Consultant General Surgeon and visiting Orthopædic, Gynæcological and Ophthalmic Surgeons. Furnished flat available. The tenure of the appointment shall be for a period not exceeding 4 years.

Apply, giving full details and references, to Group Secretary, North Monmouthshire Hospital Management Committee, Nevill Hall Hospital, Abergavenny, Mon.

EDINBURGH. ROYAL HOSPITAL FOR SICK CHILDREN. Applications are invited from registered medical practitioners and pre-registration graduates for a resident appointment as HOUSE SURGEON (E.N.T.) for 6 months commencing 1st April, 1959. National Health Service scale.

Applications, stating age, qualifications and experience, and names of 2 referees, to be sent not later than 4th December to the Secretary, 1, Rillbank-terrace, Edinburgh, 9.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. RESIDENT HOUSE PHYSICIAN. Approved pre-registration. Vacant 12th January, 1959. General medical duties. 6 months' appointment.

Applications, with the names and addresses of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee, at Chase Farm Hospital.

EPPING. ST. MARGARET'S HOSPITAL. House SURGEON (pre- or post-registration) to very busy General Surgical Unit. F.R.C.S. recognition applied for. Hospital within easy reach of Central London. Post vacant 15th January, 1959.

Applications, with copies of testimonials, including 1 from medical school, to reach the Group Secretary, Epping Group Hospital Management Committee, "Oak Cottage", The Plain Epping, Essex, by 5th December, 1958.

EPPING. ST. MARGARET'S HOSPITAL. House PHYSICIAN (pre-registration) to Consultant in General Medicine. Post vacant 15th January, 1959.

Applications, with copies of testimonials, 1 from medical school, to reach the Group Secretary, Epping Group Hospital Management Committee, "Oak Cottage", The Plain, Epping, Essex, by 5th December, 1958.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. EPSOM GROUP HOSPITAL MANAGEMENT COMMITTEE, SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for Whole-time OBSTETRIC AND GYNÆCOLOGICAL REGISTRAR at above Hospital. Resident post vacant shortly. Recognised in obstetrics and gynæcology by the College for M.R.C.O.G. and D.Obst.R.C.O.G. purposes. Candidates are invited to visit Hospital by appointment with Consultant in charge of Department.

Forms of application (send stamped addressed foolscap envelope) may be obtained from Group Secretary, Epsom District Hospital, for completion and return by 6th December.

FARNBOROUGH HOSPITAL, Kent. (800 Beds.) House SURGEON (general surgery) required 30th December. There are 140 surgical beds and a resident medical staff of 15 including 2 Surgical Registrars and 3 House Surgeons. Suitable for pre-registration or registered candidates. Recognised for F.R.C.S. (Eng.).

Apply, stating age, qualifications, with dates, and experience and naming 3 referees, to Administrative Officer, quoting H.S., by 1st December.

GLASGOW. BELVIDERE HOSPITAL, London-road, GLASGOW, E.1. JUNIOR HOSPITAL MEDICAL OFFICER in Tuberculosis Wards and Chest Clinic. Duties at above Hospital.

Apply, giving 3 names for reference, to the Secretary and Treasurer, Board of Management for Glasgow Royal Infirmary and Associated Hospitals, 135, Buchanan-street, Glasgow, C.1.

GLASGOW. CANNIESBURN HOSPITAL, Bearsden. JUNIOR HOSPITAL MEDICAL OFFICER. Applications are invited for this vacancy (one of 2 posts). 132 Beds, of which 42 are private.

Apply in writing, giving 2 names for reference, to the Secretary and Treasurer, Board of Management for Glasgow Royal Infirmary and Associated Hospitals, 135, Buchanan-street, Glasgow, C.1.

GLASGOW NORTHERN HOSPITALS BOARD OF MANAGEMENT. Applications are invited for the post of SENIOR HOUSE OFFICER in Medical Pediatrics at Stobhill General Hospital, Glasgow. The appointment will be for 1 year in the first instance.

Applications, stating age, qualifications, experience and present appointment and naming 2 referees, to be lodged with the Secretary, 13, Woodside-place, Glasgow, C.3, by 3rd December, 1958.

GLASGOW, S.W.1. DAVID ELDER INFIRMARY. (50 gynæcological beds.) JUNIOR HOUSE OFFICER required. Post recognised as pre-registration appointment. Recognised for M.R.C.O.G. Some experience possible with Obstetric Flying Squad.

Applications, in writing, to Medical Superintendent, Southern General Hospital, Glasgow, S.W.1.

GLASGOW, S.W.1. SOUTHERN GENERAL HOSPITAL. JUNIOR HOUSE OFFICER in Obstetrics required for 1st February, 1959. Post recognised for M.R.C.O.G. and D.Obst.R.C.O.G.

Applications, in writing, to the Medical Superintendent.

GRAVESEND AND NORTH KENT HOSPITAL, Graves-END, KENT. MEDWAY AND GRAVESEND HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN required at the above busy General Hospital. Post, which is approved for pre-registration purposes, vacant shortly. Salary £467 10s.–£577 10s. p.a. according to experience.

Applications to Hospital Secretary, stating age, experience, qualifications and nationality.

GRAVESEND AND NORTH KENT HOSPITAL, Graves-END, MEDWAY AND GRAVESEND HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required. Post, vacant now, is recognised for the F.R.C.S. and approved for pre-registration purposes. Successful applicant will be attached to 2 Consultant Surgeons with opportunity for extensive surgery and vascular work. Salary £467 10s.–£577 10s. p.a., according to experience.

Applications to Hospital Secretary, stating age, experience, qualifications and nationality.

GREENOCK. RAVENSCRAIG HOSPITAL (Mental and General). Applications are invited for the post of RESIDENT JUNIOR HOSPITAL MEDICAL OFFICER (Male or Female). The post offers experience in all branches of psychiatry, including modern forms of treatment, and outpatient clinics. Experience is available also in the medical and geriatric wards. The Hospital is recognised for the D.P.M. and facilities will be granted to attend courses in Glasgow.

Applications, with full details, and the names of 2 referees, to be forwarded to the Physician-Superintendent.

GRIMSBY. SPRINGFIELD HOSPITAL. (210 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (chest and infectious diseases) required. Single accommodation only. This Hospital contains an active Chest Unit, and appointee will also have duties at Central Chest Clinic. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 1st December, 1958, giving age, nationality, qualifications, present and previous appointments, with dates, naming 3 referees.

GUILDFORD. ROYAL SURREY COUNTY HOSPITAL (233 Beds.) RESIDENT HOUSE SURGEON required early in January. Post is tenable for 6 months and approved for pre-registration candidates and recognised for F.R.C.S. examination.

Applications, with copies of testimonials, to be sent to the Hospital Secretary.

GUILDFORD. ROYAL SURREY COUNTY HOSPITAL. (233 Beds.) CASUALTY SENIOR HOUSE OFFICER required. Post recognised for F.R.C.S. examination. 2 Casualty Officers are employed, sharing the work of the department and the orthopædic and traumatic unit, including fracture clinics. Regular instruction giving in traumatic surgery.

Applications, with copies of testimonials, to the Hospital Secretary as soon as possible.

GUILDFORD. ROYAL SURREY COUNTY HOSPITAL. (233 Beds.) SENIOR HOUSE OFFICER for Anæsthetics required early December, 1958. Resident or non-resident. Post is recognised for the F.F.A. R.C.S. and includes some work at St. Luke's Hospital. Operations in the main theatres totalled 3860 in 1957.

Apply, with full details of experience and copies of 3 testimonials, to the Hospital Secretary.

HASTINGS. ST. HELEN'S HOSPITAL. (491 Beds). HOUSE SURGEON required. Pre-registration post, recognised for F.R.C.S. Resident staff of 5. Vacant 10th December, 1958.

Apply to Hospital Administrator.

HEMEL HEMPSTEAD. ST. PAUL'S AND WEST HERTS HOSPITALS. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR in Clinical Pathology required at above Hospitals. Post now vacant. Hospitals may be visited by direct appointment.

Application form obtainable from and returnable to Secretary, West Herts Group Hospital Management Committee, 9, Rickmansworth-road, Watford, Hertfordshire.

HEMEL HEMPSTEAD, HERTFORDSHIRE. ST. PAUL'S HOSPITAL. HOUSE PHYSICIAN (pre-registration) required to commence 29th December, 1958.

Applications, giving details and enclosing copies of 2 recent testimonials, should be sent to the Hospital Secretary.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. 2 HOUSE SURGEONS (pre-registration) required. Posts vacant January.

Applications, giving full details and 2 names for reference, should be sent to the Hospital Secretary as soon as possible.

HEREFORD COUNTY HOSPITAL. (341 Beds.) House OFFICER (surgery) required immediately, pre-registration post. Hospital recognised for F.R.C.S. Married quarters are available.

Applications, with copies of 2 recent testimonials, to Medical Superintendent, County Hospital.

HEREFORD. COUNTY HOSPITAL. House Officer (obstetrics and gynæcology) required immediately, pre-registration post. Recognised for D.Obst.R.C.O.G. 48 maternity beds and 26 gynæcological beds.

Applications, with copies of 2 testimonials, to be sent to the Medical Superintendent, County Hospital, Hereford.

HEREFORD. GENERAL HOSPITAL. (154 Beds.) House OFFICERS (general surgery) required, pre-registration posts. 1 vacancy immediately, 1 post vacant 15th December. Hospital recognised by R.C.S. Duties include care of general surgical beds and in addition for 3 months of orthopædic beds and for 3 months of E.N.T. beds. Married quarters are available.

Applications, with copies of 2 testimonials, to be sent to the Group Secretary, Victoria House, Eign-street, Hereford.

HEREFORD. GENERAL HOSPITAL. (154 Beds.) HOUSE OFFICER (medicine) required. Pre-registration post.

Applications, with copies of 2 recent testimonials, to Group Secretary, Hospital Management Committee, Victoria House, Eign-street, Hereford.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for the appointment of HOUSE SURGEON (general surgery, gynæcology and obstetrics) (first or second post). To commence 22nd December, 1958. Pre-registration post, recognised under F.R.C.S. regulations.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HESWALL, WIRRAL, CHESHIRE. CLEAVER HOS-PITAL. (220 Beds.) CENTRAL WIRRAL GROUP. Locum JUNIOR HOSPITAL MEDICAL OFFICER required for at least 3 months. Excellent facilities for obtaining good knowledge of modern treatment of pulmonary tuberculosis, including major surgery. Also non-tuberculosis and children's units.

Apply on forms from Secretary, Clatterbridge Hospital, Bebington, Wirral, Cheshire, immediately.

HITCHIN, HERTFORDSHIRE. LISTER HOSPITAL. RESIDENT HOUSE SURGEON post vacant 29th December.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent to the Medical Administrator, Lister Hospital.

HITCHIN, HERTFORDSHIRE. NORTH HERTS HOS-PITAL. RESIDENT HOUSE SURGEON required 4th December. Recognised as pre-registration post and for F.R.C.S.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, should be sent to the Medical Administrator, Lister Hospital, Hitchin.

HITCHIN HOSPITALS, Hitchin, Hertfordshire. Resident ANÆSTHETIST (Senior House Officer) required 1st January, 1959. Recognised for D.A. and F.F.A. R.C.S. examinations.

Applications, stating age, nationality, qualifications and experience, together with names of 2 referees, to the Medical Administrator, Lister Hospital, Hitchin, by 3rd December, 1958.

HOUNSLOW HOSPITAL, Staines-road, Hounslow, MIDDLESEX. (General acute—81 Beds.) Applications are invited for the appointment of RESIDENT HOUSE PHYSICIAN. Recognised pre-registration appointment for 6 months. Post vacant 10th December.

Applications, stating qualifications and age, together with copies of up to 3 recent testimonials, or names for reference, to the Hospital Secretary.

HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required to commence duty immediately. The post is recognised as a pre-registration appointment and for the F.R.C.S. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Group Secretary,
Huddersfield Hospital Management Committee,
The Royal Infirmary, Huddersfield.

IPSWICH AND EAST SUFFOLK HOSPITAL (Anglesea-ROAD WING). (350 Beds.) Applications invited for post of CASUALTY OFFICER (Senior House Officer grade), vacant 1st January, 1959. Post recognised for F.R.C.S. examinations.

Applications, stating age, nationality and experience, with copies of recent testimonials, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL (Anglesea-ROAD WING). (350 Beds.) Applications invited for SENIOR HOUSE OFFICER to Fracture and Orthopædic Department. Post recognised for F.R.C.S. examinations. The Department has about 60 Beds and a large outpatient attendance, offering wide experience.

Applications, stating age, nationality and experience, together with copies of recent testimonials, to Hospital Secretary.

IPSWICH. FOXHALL HOSPITAL. (Actively engaged in the investigation and treatment of all forms of chest disease, including Respiratory Physiology Department and major surgery.) SENIOR HOUSE OFFICER required early November for duties mainly on non-tuberculous and surgical wards. Married quarters available.

Further particulars from Dr. G. R. MCNAB, Physician-Superintendent, to whom applications should be made.

IPSWICH. ST. HELEN'S HOSPITAL. (129 Beds for infectious diseases, pulmonary tuberculosis, long-stay orthopædics and geriatrics. The area Chest Clinic is in the Hospital.) HOUSE PHYSICIAN required (post-registration appointment). Accommodation available for married man.

Applications to JOHN WILLIAMS, Group Secretary, Ipswich Group Hospital Management Committee, at the Ipswich and East Suffolk Hospital (Anglesea-road Wing), Ipswice.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Locum REGISTRAR in Anæsthetics. Applicants should possess the D.A. or F.F.A.R.C.S. or have had wide experience in anæsthetics. Locum required for an indefinite period.

Apply, stating age, nationality, experience and qualifications, to Medical Director, West Middlesex Hospital, Isleworth, Middlesex.

KENDAL. WESTMORLAND COUNTY HOSPITAL. JUNIOR HOSPITAL MEDICAL OFFICER (surgical) required in the Surgical Unit. The post offers excellent experience in general surgery. The successful candidate will also be expected to participate in the general work of the Hospital. Salary will be determined by applicant's present post and previous service.

Full particulars, stating age, experience and qualifications, with names of 2 referees, should be forwarded to the Group Secretary, Royal Lancaster Infirmary, Lancaster.

KETTERING AND DISTRICT GENERAL HOSPITAL, NORTHAMPTONSHIRE. Applications are invited for the post of HOUSE SURGEON (pre-registration) which becomes vacant on 1st December, 1958. Post recognised for F.R.C.S.

Applications, stating age, experience and qualifications, together with copies of 3 recent testimonials, to be sent to the Group Secretary at the above address.

KETTERING GENERAL HOSPITAL, Kettering. (144 Beds.) Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER in Anæsthetics, vacant now. Post recognised for D.A.

Applications, giving details of qualifications and experience, and enclosing copies of 3 recent testimonials, to be sent to the Group Secretary, Kettering and District Hospital Management Committee, at the above address.

LEEDS REGIONAL HOSPITAL BOARD. Registrar vacancies.

General Surgery

Harrogate and District General Hospital. (65 general surgical beds.) Resident or non-resident. Accommodation available for a single person. Recognised for F.R.C.S.

Orthopædic Surgery

Harrogate General Hospital. (Total Beds 253—38 orthopædic beds.) A small detached house is expected to become available for rental in January, 1959.

Psychiatry

(*a*) Storthes Hall Hospital, Huddersfield. (2750 Beds.) Resident.

(*b*) Broadgate Hospital, Beverley. (650 Beds.) Resident. Accommodation for single person only.

Applications, stating age, qualifications and details of present and previous appointments, with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 26th November, 1958.

LEEDS REGIONAL HOSPITAL BOARD. Registrar vacancies.

Geriatrics

Hull A Group (328 geriatric beds in the charge of a Consultant Geriatrician). Duties include 3 sessions in general medicine. Non-resident.

Thoracic Surgery

Thoracic Surgery Units at the Bradford Royal Infirmary and the Middleton Hospital (aggregate of 61 Beds, both non-tuberculous and tuberculous cases). Non-resident.

Applications, stating age, qualifications, and details of present and previous appointments, with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 26th November, 1958.

LEICESTER HOSPITALS. Sheffield Regional Hospital BOARD. Whole-time NON-RESIDENT REGISTRAR (anæsthetics) required to work at hospitals in the area of the Leicester Nos. 1 and 2 Hospital Management Committee Groups, the principal hospitals being Leicester Royal Infirmary, Leicester General Hospital, and Leicester Isolation Hospital and Chest Unit. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 1st December, 1958, giving age, nationality, qualifications, present and previous appointments, with dates, naming 3 referees.

LEICESTER. TOWERS MENTAL HOSPITAL. (1168 Beds.) Applications are invited for the whole-time post of JUNIOR HOSPITAL MEDICAL OFFICER. Salary £852 10s.–£55–£1182 10s. There is ample opportunity for experience in all branches of psychiatry including outpatient work, and the hospital is recognised for D.P.M. experience. Facilities for post-graduate training exist at Sheffield University. Resident accommodation is available for a single man or woman for which the appropriate charge will be made. Candidates must have completed their service with H.M. Forces.

Applications, giving age, nationality, and full details, with the names of 2 referees, to be sent to the Medical Superintendent as soon as possible.

LIVERPOOL. WALTON HOSPITAL. (1285 Beds.) Vacancies are available now for:—

SENIOR HOUSE OFFICERS in Regional Neurosurgical Unit. Recognised for F.R.C.S. diploma. Term of 1 year, renewable.

SENIOR HOUSE OFFICER in Orthopædics, also recognised for F.R.C.S. diploma.

Apply to Physician-Superintendent, giving names of 2 referees and details of age, nationality and qualifications.

LUTON AND DUNSTABLE HOSPITAL, Luton. (250 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time SURGICAL REGISTRAR required at the above Hospital. Post is vacant early in the New Year, and recognised for F.R.C.S. The Hospital may be visited by direct appointment.

Application forms obtainable from the Secretary, Luton and Hitchin Group Hospital Management Committee, St. Mary's Hospital, Luton, and returnable by 11th December.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE SURGEON, 6 months' appointment. Vacant 3rd January, 1959. Recognised for F.R.C.S. Salary at the rate of £467 10s.–£577 10s. p.a. A deduction at the rate of £125 a year is made for board and lodging, and other services provided.

Applications should be forwarded, as soon as possible, to the Administrative Officer at the Hospital.

MANCHESTER. BOOTH HALL CHILDREN'S HOSPITAL, BLACKLEY, MANCHESTER, 9. Regional centre for severe burns and scalds and plastic surgery (unit of 45 Beds).

JUNIOR HOSPITAL MEDICAL OFFICER required for post vacant on 1st December. £170 deducted for full emoluments.

Applications, giving names and addresses of 2 referees, to be sent to Group Secretary, from whom further particulars may be obtained.

MANCHESTER, 20. CHRISTIE HOSPITAL AND HOLT RADIUM INSTITUTE. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered practitioners for the post of ASSISTANT RESIDENT SURGICAL OFFICER (Senior House Officer grade). The post provides experience in the treatment of tumours and good opportunity for study.

Applications, with full details, including the names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20, immediately.

MANCHESTER REGIONAL HOSPITAL BOARD. Royal INFIRMARY AND QUEEN'S PARK HOSPITAL, BLACKBURN. REGISTRAR, Department of Psychological Medicine. Post vacant mid-December, 1958. Opportunity for wide experience in the treatment of inpatients and outpatients in general hospitals (including psychiatric inpatients' in general medical wards) under direction of Consultant Psychiatrist. Modern, self-contained flat available suitable for married man. Recognised for D.P.M. by Conjoint Board and Manchester University. Facilities for attending D.P.M. course, Manchester University, and studying for higher qualifications. Services of social worker and mental health workers.

Application forms from Group Secretary, Royal Infirmary, Blackburn.

MANCHESTER REGIONAL HOSPITAL BOARD. Senior REGISTRAR in Anæsthetics with duties in the South Manchester Group of hospitals (Withington, Duchess of York Babies' Hospital, Christie Hospital and Holt Radium Institute, Baguley Hospital for thoracic surgery, Wythenshawe Hospital for plastic surgery, &c.) F.F.A. R.C.S. desirable. The post is included in the rotation scheme organised by the United Manchester Hospitals and the Regional Hospital Board and it is expected that the appointee will later transfer to the Manchester Royal Infirmary and possibly to another regional centre to continue training.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by 8th December, 1958.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for the post of OBSTETRICAL HOUSE SURGEON to a maternity unit operating temporarily in the Whitworth Park Branch of the above-named Hospital, vacant 27th January, 1959. The post is supernumerary to the establishment recognised for training purposes by the Royal College of Obstetricians and Gynæcologists. Previous obstetrical experience is desirable. An opportunity exists for a limited amount of gynæcological training during tenure of the post. National scales.

Application forms, which may be obtained from the undersigned, to be returned no later than 30th November, 1958.

A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER 13. REGISTRAR to the E.N.T. Department, to commence on 1st February, 1959. Whole-time non-resident appointment for 12 months, renewable.

Application form, obtainable from the undersigned, to be returned by 6th December, 1958.

G. H. HEATON, Secretary.

MANCHESTER VICTORIA MEMORIAL JEWISH HOSPITAL. (Non-Sectarian—104 Beds.) Applications are invited for the resident post of SENIOR HOUSE OFFICER in Surgery, to act as Deputy Resident Surgical Officer. Recognised for F.R.C.S. Vacant 27th January, 1959.

Applications quoting Lan. 1, with names of 2 referees, by 22nd December, 1958, to Group Secretary, North Manchester Hospital Management Committee, Crumpsall Hospital, Manchester, 8.

MANCHESTER. WEST MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. ECCLES AND PATRICROFT HOSPITAL, ECCLES. (General Hospital—47 Beds.) RESIDENT SENIOR HOUSE OFFICER required. The work of the Hospital is mainly surgical and there is a busy Casualty Department. The person appointed will be 1 of 2 Resident Senior House Officers.

Applications, giving full details, together with names and addresses of 2 referees, to Group Secretary, Park Hospital, Davyhulme, Manchester.

MANCHESTER. WEST MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. PARK HOSPITAL, DAVYHULME. (General Hospital—433 Beds.) HOUSE OFFICER (pædiatrics) required. Post-registration. There is a midwifery unit of 73 Beds and a pædiatric unit which includes 10 thoracic surgical beds. Recognised for D.C.H. Post vacant mid-January.

Applications, together with names and addresses of 2 referees, to be forwarded to the Group Secretary.

MANCHESTER, 20. WITHINGTON HOSPITAL. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (surgical) including casualty duties, vacant early February, 1959. The post, which is normally tenable for 12 months, is recognised by the Royal College of Surgeons for the final F.R.C.S. examination, and possession of the primary F.R.C.S. will be an advantage. The Hospital is recognised by the Manchester University for the teaching of undergraduate students.

Applications, with full details, to the Group Secretary, Withington Hospital, as soon as possible.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (orthopaedics) required at the above Hospital. This post offers excellent experience for persons who ultimately intend to specialise in orthopaedic and accident work. In addition to the routine orthopaedic duties of a general hospital, the unit carries out the reconstruction surgical programme of patients from the Devonshire Royal Hospital, Buxton, which has a regional catchment area.

Applications, with full details and the names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, as soon as possible.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for 2 posts of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade), one of which is now vacant and the second will be required in late January, 1959. Previous experience in pathology not essential, the posts affording opportunities for gaining experience in all branches of clinical pathology.

Applications, stating age, qualifications, present post, experience, and the names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20.

MARKFIELD HOSPITAL, Leicestershire. (215 Beds.) Applications are invited for the appointment of RESIDENT SENIOR HOUSE OFFICER (medical). Experience will be gained in tuberculosis and other diseases of the chest; area chest clinic in hospital in close association with major chest unit in area. Time and opportunity for study.

Applications, giving age, qualifications, previous appointments, together with copies of recent testimonials, to Physician-Superintendent.

MIDDLESBROUGH GENERAL HOSPITAL, Ayresome Green-lane, MIDDLESBROUGH. (305 Beds.) SOUTH TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER (orthopaedics) at the above Hospital. The post is recognised for the F.R.C.S. examination and includes some duties in the Casualty Department, which is under the supervision of a full-time Senior Casualty Officer.

Applications, stating age, qualifications and experience, together with the names of 2 referees, should be sent to the Hospital Secretary as soon as possible.

MIDDLESBROUGH GENERAL HOSPITAL, Ayresome Green-lane, MIDDLESBROUGH. (305 Beds.) SOUTH TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of HOUSE OFFICER (general surgery) at the above Hospital. The post is recognised for pre-registration service.

Applications, stating full details, and giving 2 names for reference, should be addressed to the Hospital Secretary as soon as possible.

MIDDLESBROUGH GENERAL HOSPITAL, Ayresome Green-lane, MIDDLESBROUGH. (305 Beds.) SOUTH TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER (casualty) at the above Hospital. The post offers excellent experience in a very busy department for which there is a whole-time Senior Casualty Officer and 2 whole-time Senior House Officers.

Applications, stating full details, together with names for reference, should be sent to the Hospital Secretary as soon as possible.

NEWARK GENERAL HOSPITAL. Nottingham No. 1 HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (surgical) required for above Hospital situated on Great North Road, approximately 20 miles from Nottingham. Post offers good experience. Consultant staff attending Newark Hospital are on one or more of the Nottingham Hospitals. Flat available as married quarters. Salary and conditions of service in accordance with Ministry regulations. Duties to commence immediately.

Applications, giving names of 3 referees, should be sent to Group Secretary, Nottingham No. 1 Hospital Management Committee, General Hospital, Nottingham.

NEWCASTLE GENERAL HOSPITAL. Newcastle upon TYNE HOSPITAL MANAGEMENT COMMITTEE. Department of Neurological Surgery—Regional Unit. SENIOR HOUSE OFFICER. Post vacant end of November. Recognised for F.R.C.S.

Applications, together with names and addresses of 2 referees, should be sent to the Secretary, Newcastle General Hospital, Newcastle upon Tyne, 4.

NEWCASTLE GENERAL HOSPITAL (800 Beds). WALKERGATE HOSPITAL (309 Beds), HOSPITAL FOR SICK CHILDREN (106 Beds). The following resident posts become vacant on 7th January, 1959:—

HOUSE PHYSICIANS (5), pediatrics. (Hospital for Sick Children, Newcastle upon Tyne (2); Children's Department, Newcastle General Hospital (2), and Walkergate Hospital (1).)

3 of the posts are for pre-registration candidates (medical and surgical). The posts offer experience in the whole of the paediatric work of the hospitals, including general medicine and surgery and the special departments. There is close association with the University Department of Child Health. Applications for the pre-registration posts will be accepted from students on the point of taking their qualifying examination.

Applications, together with copies of 2 testimonials, should be sent to the Secretary, Newcastle General Hospital, Newcastle upon Tyne, 4, by 6th December, 1958.

NEWCASTLE GENERAL HOSPITAL. (800 Beds.) The following resident posts which are recognised for the purpose of pre-registration service become vacant on 7th January, 1959:—

HOUSE PHYSICIANS (4), general medical wards. (2 of these posts rotate with the House Physician post in the Cardiovascular Department.)

HOUSE PHYSICIAN (1), Cardiovascular Department. (This post rotates with the 2 House Physician posts in General Medicine.)

HOUSE PHYSICIAN (1), Geriatric Unit.

HOUSE SURGEONS (2), General Surgery. (Recognised for F.R.C.S. Diploma.)

*HOUSE SURGEON (1) Accident and Admission Department. (Recognised for F.R.C.S. Diploma.)

*The person appointed to this post will be given preference for one of the Obstetrical House Surgeon posts in July, 1959.

Applications will be accepted from students on the point of taking their qualifying examination. If a candidate wishes to be considered for more than 1 post, separate applications should be submitted.

Applications, together with names and addresses of 2 referees, should be sent to the Secretary, Newcastle General Hospital, Newcastle upon Tyne, 4, not later than 6th December, 1958.

NEWCASTLE REGIONAL HOSPITAL BOARD. Registrar PHYSICIAN, whole-time, Durham Group of hospitals—main hospital, Chester-le-Street General (204 Beds.) Married or single accommodation (house available).

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle-upon-Tyne, 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. West CUMBERLAND GROUP OF HOSPITALS. Whole-time REGISTRAR PHYSICIAN to be based on Whitehaven Hospital (124 Beds). Appointment for 1 year in the first instance, but may be renewed for a further period.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, 72, Warwick-road, Carlisle, within 14 days.

NEWCASTLE UPON TYNE HOSPITAL MANAGE-MENT COMMITTEE AND HEXHAM AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Departments of Obstetrics and Gynæcology. Applications are invited for the following posts, vacant on 7th January, 1959:—

(1) **Newcastle General Hospital** (800 Beds)

Department of Obstetrics and Gynæcology (100 Beds).

HOUSE SURGEONS, resident (pre-registration) (3).

This department is recognised for the M.R.C.O.G. and D.Obst.R.C.O.G., and undertakes the training of medical students in the University of Durham. Preference will be given to provisionally registered candidates who have already held an initial pre-registration appointment.

(2) **Hexham General Hospital** (304 Beds)

Gynæcology: HOUSE SURGEON, resident (pre-registration). Recognised for M.R.C.O.G. Applications considered from final year students in anticipation of graduation.

(3) **Dilston Hall Maternity Hospital, Corbridge** (50 Beds)

Obstetrics: HOUSE SURGEON, resident (pre-registration). Recognised for D.Obst.R.C.O.G.

Applications, together with copies of 2 testimonials, should be sent to the Secretary, Newcastle General Hospital, Westgate-road, Newcastle upon Tyne, 4, by 6th December, 1958.

NEWPORT, I.W. ST. MARY'S HOSPITAL. Isle of WIGHT GROUP HOSPITAL MANAGEMENT COMMITTEE. RESIDENT HOUSE SURGEON (Senior House Officer grade, at £819 10s. p.a.) required 1st December. Post recognised for F.R.C.S.

Applications to Hospital Secretary immediately.

NEWTON ABBOT HOSPITAL. Resident Senior House SURGEON, Male or Female, required immediately, to act as Casualty Officer and House Surgeon to special departments, together with relief duties. Ability to give outpatient anæsthetics advantageous. Married quarters available.

Applications (quoting reference F.364/41), stating qualifications, nationality, age, with copy testimonials, to be sent to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, South Devon.

NORTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD. SURGICAL REGISTRAR (resident) required 19th January, 1959, for 1 year in the first instance at the North Herts Hospital, Hitchin (where he will reside), and the Lister Hospital, Hitchin. Post recognised for F.R.C.S. The Hospitals may be visited by direct appointment with the Medical Administrator, Lister Hospital.

Application forms obtainable from the Secretary, Luton and Hitchin Group Hospital Management Committee, St. Mary's Hospital, Luton, and returnable by 1st December.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of MEDICAL REGISTRAR. Hospital may be visited by direct appointment.

Application forms obtainable from and returnable to the Group Secretary, Harefield and Northwood Group Hospital Management Committee, Mount Vernon Hospital, Northwood, Middlesex, by 8th December, 1958.

NOTTINGHAM CITY HOSPITAL. (311 Beds.) Applica-tions are invited for the post of RESIDENT PATHOLOGIST (Senior House Officer). Previous experience an advantage. Post vacant 1st January, 1959.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM EYE HOSPITAL. Senior House Officer (ophthalmology) required. Duties to commence on 23rd December, 1958. Salary and conditions of service in accordance with Ministry regulations.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Pre-registration HOUSE SURGEON required. Duties to commence immediately.

Applications, stating age, qualifications, and experience, together with copies of testimonials, to be sent to Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Senior House OFFICER (anæsthetics) required about 1st January, 1959. The post is recognised for the D.A. and the F.F.A. R.C.S. This is a busy general hospital, giving experience in all branches of surgery.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

NORWICH. NORFOLK AND NORWICH HOSPITAL. JUNIOR ORTHOPÆDIC HOUSE SURGEON required. This is a pre-registration post. 2 House Officers employed in the department. Membership of a Medical Defence Society is a condition of appointment.

Application, giving full details, together with names of 2 referees, to Group Secretary, Hospital Management Committee, St. Stephen's-road, Norwich.

NORWICH. WEST NORWICH HOSPITAL, Bowthorpe-road, NORWICH. Locum SURGICAL REGISTRAR required until permanent appointment is made. Salary £19 5s. per week in accordance with terms and conditions of service of hospital medical staff. Membership of a medical defence society is a condition of appointment.

Applications, stating age, qualifications and experience, together with names of 2 referees, to Group Secretary, Hospital Management Committee, St. Stephen's-road, Norwich.

NUNEATON. MANOR HOSPITAL. House Surgeon in Orthopædics and General Surgery (pre-registration). Recognised F.R.C.S. Resident.

Applications to Hospital Secretary.

OXFORD REGIONAL HOSPITAL BOARD. Senior REGISTRAR in Psychiatry at St. Crispin Hospital, Duston, Northampton. Appointment for 1 year in the first instance, and, subject to satisfactory service, renewable for up to 4 years. It may be possible to arrange transfer to another mental hospital in the Oxford Region for the second half of the appointment. St. Crispin Hospital provides full training facilities, including Electroencephalography Department. Previous experience in child guidance work desirable. Applicants should hold the D.P.M. Accommodation, including 6-roomed house, available if required.

Applications, on forms obtainable from the Secretary, Joint Committee for Senior Registrars, 43, Banbury-road, Oxford, should reach him by 6th December.

OXFORD. THE UNITED OXFORD HOSPITALS. Applications are invited for the post of SENIOR HOUSE PHYSICIAN in General Medicine at the Churchill Hospital, commencing on 1st February, 1959, for 6 months.

Application forms are obtainable from the Administrator, Radcliffe Infirmary, Oxford, and should be received not later than 6th December, 1958.

OXFORD. THE UNITED OXFORD HOSPITALS. Applications are invited for the post of SENIOR HOUSE OFFICER at the Cowley Road Hospital which is concerned with the treatment of acute and long-stay geriatric patients. This post will be vacant with effect from 1st February, 1959, for 6 months in the first instance.

Applications, with names of 2 referees, to the Administrator, Radcliffe Infirmary, Oxford, should be received not later than 6th December, 1958.

PAISLEY. ROYAL ALEXANDRA INFIRMARY ANNEXE JUNIOR HOSPITAL MEDICAL OFFICER, resident or non-resident, required for above Infirmary for duties, but mainly concerned with chronic sick.

Applications to Group Medical Superintendent, Royal Alexandra Infirmary, Paisley.

PLYMOUTH. SCOTT ISOLATION HOSPITAL. PLYMOUTH SPECIAL HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER from Male registered medical practitioners who have preferably been qualified for 1 year, and have had previous hospital experience. The applicant should be able to drive a car. The duties, in 2 departments, will be chiefly in connection with infectious and venereal diseases, the former including a substantial proportion of cases in children. The varied clinical work, including acute medical cases, provides valuable experience, particularly to those reading for a higher medical degree, or contemplating general practice. The appointment will be for 1 year, vacant on 1st January, 1959. There is accommodation for either a married or single candidate.

Applications, together with copies of 2 recent testimonials, should be sent to the Group Secretary, Plymouth Special Hospital Management Committee, 8, Nelson-gardens, Stoke, Plymouth.

PLYMOUTH. SCOTT ISOLATION HOSPITAL. House PHYSICIAN (resident), post vacant 9th January, 1959. Recognised pre-registration post which offers excellent experience.

Applications should be sent to the Group Secretary, Plymouth Special Hospital Management Committee, 8, Nelson-gardens, Stoke, Plymouth, Devon.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL, Greenbank-road, PLYMOUTH. HOUSE PHYSICIANS, pre-registration posts, vacancies 1st and 14th January, 1959.

Apply with names of 3 referees, also stating age, nationality, qualifications and experience to the Group Secretary, 7, Nelson-gardens, Plymouth.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL, FREEDOM FIELDS. Central Casualty Department. Resident Locum SENIOR HOUSE OFFICER in Casualty, vacant immediately. Recognised for the F.R.C.S.

Applications, with names of 3 referees, to be sent to the Group Secretary.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL.

HOUSE SURGEON, pre-registration post, vacant 1st December, 1958. Devonport Section.

HOUSE SURGEONS, pre-registration posts, vacancies, 2 on 1st January, 1959. Freedom Fields Section.

HOUSE SURGEONS, pre-registration posts, vacancies, 1 immediately, and 9th January, 1959. Greenbank-road Section.

All posts are recognised for the F.R.C.S.

Apply with names of 3 referees, also stating age, nationality, qualifications and experience to the Group Secretary, 7, Nelson-gardens, Plymouth.

PONTEFRACT AND CASTLEFORD HOSPITAL MANAGEMENT COMMITTEE. ANÆSTHETIST (Junior Hospital Medical Officer) required for duties at hospitals throughout the Group. Post resident or non-resident.

Applications, giving details of experience and the names and addresses of 2 referees, to the Group Secretary, Great Northern House, Salter-row, Pontefract, Yorkshire.

PONTEFRACT GENERAL INFIRMARY. Resident CASUALTY OFFICER required immediately. Graded Senior House Officer. Recognised for Fellowship. Married accommodation available end of December, 1958.

Applications to the Secretary, Pontefract and Castleford Hospital Management Committee, Great Northern House, Salter-row, Pontefract, Yorkshire.

PONTYPRIDD (near). EAST GLAMORGAN HOSPITAL, CHURCH VILLAGE, near PONTYPRIDD. (Committee's Base Hospital—336 Beds and large Outpatient Department—serving population of 174,000.) Locum HOUSE OFFICER (pædiatrics) required for the period 1st December, 1958–31st January, 1959.

Applications, stating age, qualifications and details of experience, to be sent as soon as possible to the Group Secretary, Pontypridd and Rhondda Hospital Management Committee, Courthouse-street, Pontypridd.

POOLE GENERAL HOSPITAL, Poole, Dorset. Bournemouth AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON (pre-registration) required immediately. Post recognised for F.R.C.S. and F.R.C.S.(Ed.).

Applications to the Hospital Secretary.

POOLE GENERAL HOSPITAL, Poole, Dorset. Bournemouth AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN (pre-registration) required immediately.

Applications to the Hospital Secretary.

PRESTON ROYAL INFIRMARY. (400 Beds.) Casualty OFFICER (Senior House Officer grade) required. Post recognised for F.R.C.S. Junior of 2 appointments in this department. Vacant early January, 1959.

Applications, with names of 2 referees, to Group Secretary, Preston and Chorley Hospital Management Committee, Royal Infirmary, Preston, Lancs.

READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (Area Accident and Orthopædic Department). Recognised for F.R.C.S. Duties include work in Area Casualty Department at Battle Hospital, Reading. Person appointed will work with Registrar and House Officer.

Apply, giving nationality, present post, and qualifications with dates, together with the names of 2 referees, to Group Secretary, 3, Craven-road, Reading.

READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER to the Department of Geriatric Medicine, which is being developed at Battle Hospital, Reading, under the charge of a Consultant Geriatric Physician.

Further particulars may be obtained from the Group Secretary, 3, Craven-road, Reading, to whom applications, stating age, qualifications, and names of 3 referees, should be addressed.

READING AREA DEPARTMENT OF MEDICINE. Applications are invited from registered and provisionally registered medical practitioners for 2 posts as RESIDENT HOUSE PHYSICIAN, vacant 1st December, 1958, for 6 months. Successful candidates required to carry out duties at the following Reading Hospitals: Royal Berkshire (397 Beds) and Prospect Park (104 Beds).

Write immediately, stating age, qualifications with dates, nationality, present post, with copies of 2 recent testimonials, to Secretary, Royal Berkshire Hospital, Reading.

READING. ROYAL BERKSHIRE HOSPITAL. (397 Beds.) Applications are invited from registered and provisionally registered medical practitioners for 2 posts as RESIDENT HOUSE SURGEON, vacant 26th November and 1st December, 1958, and tenable for 6 months.

Write, stating age, qualifications with dates, nationality, present post, with copies of 2 recent testimonials, to Secretary.

READING. ROYAL BERKSHIRE HOSPITAL. (338 Beds.) Applications are invited from registered medical practitioners (Male or Female) for the post of RESIDENT SENIOR HOUSE OFFICER (anæsthetics). Vacant immediately for a period of 1 year. Post recognised for F.F.A. R.C.S.

Write, stating age, qualifications with dates, nationality and present post, together with names of 3 referees, to Group Secretary, Reading and District Hospital Management Committee, 3, Craven-road, Reading.

ROCHFORD GENERAL HOSPITAL. (620 Beds.) Applications required from pre-registration candidates for a 6-month appointment as HOUSE SURGEON (recognised for F.R.C.S.). Post vacant 1st December, 1958.

Applications, &c. (1 testimonial only necessary from pre-registration candidates seeking first appointment), to be sent to the Secretary by 26th November, 1958.

ROCHFORD GENERAL HOSPITAL. (620 Beds.) Applications required for the post of HOUSE PHYSICIAN (pre-registration). Post vacant 17th December, 1958.

Applications, &c. (1 testimonial only necessary from pre-registration candidates seeking first appointment), to be sent to the Secretary by 29th November, 1958.

RHYMNEY AND SIRHOWY VALLEYS HOSPITAL MANAGEMENT COMMITTEE.

St. James Hospital, Tredegar, Monmouthshire (38 general medicine, 43 chronic sick, and 43 obstetric beds). Married quarters.

OBSTETRIC HOUSE OFFICER (1st February).

Tredegar General Hospital (Surgical Unit of 50 Beds plus 6 orthopædic beds under daily supervision of Consultant Surgeon and visiting supervision of Orthopædic Surgeon. Busy Outpatient, Casualty, and Radiological Departments.) Married quarters.

HOUSE SURGEON (1st February) with opportunity to follow on to a House Physician or House Officer (obstetrics) if satisfactory.

Caerphilly District Hospital (acute general hospital, 226 Beds), 6 miles from Cardiff. Married quarters may be available. Vacancies on 1st February.

2 HOUSE SURGEONS, 1 with duties also in Orthopædic Department. Both recognised for F.R.C.S.

HOUSE PHYSICIAN.

Applications to the Group Secretary, Central Offices, Caerphilly-road, Ystrad Mynach, Hengoed, Glamorgan.

ROCHDALE AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (medicine) (Assistant Resident Medical Officer) required immediately at Birch Hill General Hospital. Resident staff includes Registrar (Resident Medical Officer), and 3 House Physicians.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs.

ROCHESTER, KENT. ST. BARTHOLOMEW'S HOSPITAL. MEDWAY AND GRAVESEND HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON. Applications are invited for this pre-registration post in general surgery, vacant now. Recognised for F.R.C.S. Salary scale £467 10s.–£577 10s. p.a. according to experience.

Applications, stating age, qualifications, experience and nationality, to the Hospital Secretary.

ROCHESTER, KENT. ST. BARTHOLOMEW'S HOSPITAL. MEDWAY AND GRAVESEND HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE SURGEON (orthopædics) required. Post vacant now and tenable for 1 year. Recognised for the F.R.C.S. and providing excellent experience. Salary £819 10s., less £150 p.a. for residential emoluments.

Applications, stating age, qualifications, experience and nationality, with recent testimonials, to Hospital Secretary.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) RESIDENT HOUSE SURGEONS (2) required, 1 immediately and 1 on 3rd December next, in the General Surgical Unit. Recognised for F.R.C.S. Open to either pre-registration applicants or to fully registered practitioners. This very active Unit of a total of approximately 180 Beds affords ample opportunities for candidates to obtain first-class tuition and experience. The candidates appointed will be attached to a unit of approximately 60 Beds.

Apply immediately to Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) ORTHOPÆDIC HOUSE SURGEON (resident) required in the Orthopædic and Accident Unit. The service consists of 100 Beds equally divided between traumatic surgery and "cold" orthopædics. Post is recognised for pre-registration purposes and for F.R.C.S.

Applications to be sent to Group Secretary, Romford Hospital Management Committee, Oldchurch Hospital, as soon as possible.

SALFORD. HOPE HOSPITAL. Manchester Regional HOSPITAL BOARD. Applications invited for post of PÆDIATRIC REGISTRAR at the above Hospital, which has 75 pediatric beds, 66 maternity beds with neonatal unit. The department is recognised by the University for undergraduate teaching of pædiatrics.

Applications to Group Secretary, Salford Hospital Management Committee, Salford Royal Hospital, Salford, 3, before 29th November, 1958.

SALISBURY GENERAL HOSPITAL. Applications are invited for the combined appointment of HOUSE SURGEON in General Surgery and OBSTETRIC AND GYNÆCOLOGICAL HOUSE SURGEON (recognised by R.C.O.G.) to run consecutively in this order for a period of 6 months in each post from 20th January, 1959. Vacancy for Locum HOUSE SURGEON available now until 20th January. Posts open to pre-registration candidates.

Apply, naming 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. Applications are invited for the appointment of RESIDENT HOUSE SURGEON/HOUSE PHYSICIAN to run consecutively in this order for a period of 6 months in each post, from 1st January, 1959. Posts open to pre-registration candidates.

Apply, naming 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. South West Metropolitan REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR or SENIOR HOUSE OFFICER to the Orthopædic Department. The posts are recognised under Fellowship Regulations and offer wide practical experience in traumatic and general orthopædics, including children. Opportunity to attend postgraduate lectures for primary F.R.C.S.

Application forms for the Registrar post may be obtained from and must be returned to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury, by 2nd December, 1958.

SHEFFIELD. CITY GENERAL HOSPITAL. Sheffield REGIONAL HOSPITAL BOARD. Locum RESIDENT REGISTRAR (thoracic surgery) required immediately at above Hospital. Remuneration £19 5s. per week.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, naming 2 referees.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. ROYAL INFIRMARY. Applications invited for the non-resident post of SENIOR REGISTRAR in Orthopædics, at the above Hospital.

Applications, stating age, qualifications and experience, with the names of 3 referees, should be sent not later than 5th December, 1958, to the Chief Administrative Officer, The United Sheffield Hospitals, West-street, Sheffield, 1.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Applications invited for the following posts:—

(*a*) SENIOR REGISTRAR in Ophthalmology, duties primarily at the Royal Infirmary.

Closing date for applications 2nd December, 1958.

(*b*) REGISTRAR or SENIOR HOUSE OFFICER in General Medicine at the Royal Infirmary. Successful applicant will work principally in the Professional Unit (Therapeutics).

Closing date for applications 25th November, 1958.

(*c*) REGISTRAR or SENIOR HOUSE OFFICER at the Children's Hospital Jessop Hospital, in association with the Department of Child Health in the University of Sheffield. Post is a rotating one between the 2 hospitals, and the successful candidate will spend part of his time in charge of the newborn babies at the Jessop Hospital, a period in the Professiorial Department at the Children's Hospital, and a further period undertaking the medical care of surgical patients at the Children's Hospital. Post vacant 1st January, 1959.

Closing date for applications 25th November, 1958.

Applications for all 3 posts should give names of 3 referees and be sent to Chief Administrative Officer, United Sheffield Hospitals, West-street, Sheffield, 1.

SHEFFIELD. WHARNCLIFFE HOSPITAL. (129 Beds.) Locum Tenens SENIOR HOUSE OFFICER (surgery and orthopædic). Non-resident or single accommodation available. Post immediately vacant and until 14th January, 1959.

Applications, with copy of testimonials, to Group Secretary, Sheffield No. 2 Hospital Management Committee, Middlewood Hospital, Sheffield, 6.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time non-resident post of SURGICAL REGISTRAR at the Inverness Hospitals.

Further particulars and application schedules can be obtained from the undersigned, with whom applications should be lodged by 6th December, 1958. A. M. FRASER,

Secretary and Administrative Medical Officer.

Office of the Northern Regional Hospital Board,
Reay House, 17, Old Edinburgh-road, Inverness.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. REGISTRAR at Dingleton Mental Hospital, Melrose. During the tenure of the post opportunities for interchange of duty and training at other centres in the Region may be available under the joint training scheme of the South-Eastern Regional Hospital Board and the Department of Psychological Medicine of the University of Edinburgh. A house is available.

Apply, giving particulars of age, qualifications and previous experience, and the names of 2 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 13th December, 1958.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. REGISTRAR at Gogarburn Mental Deficiency Institution, Edinburgh. During the tenure of the post opportunities for interchange of duty and training at other centres in the Region may be available under the joint training scheme of the South-Eastern Regional Hospital Board and the University Department of Psychological Medicine.

Apply, giving particulars of age, qualifications and previous experience, and the names of 2 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 13th December, 1958.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments, which will be for 1 year in the first instance:—

REGISTRAR in Pædiatrics based at Stobhill General Hospital, Glasgow.

REGISTRAR in Surgery based at Stobhill General Hospital, Glasgow, and with duties on a rotational basis at Falkirk and District Royal Infirmary.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, by 6th December, 1958.

SCUNTHORPE. WAR MEMORIAL HOSPITAL. (262 Beds.) Immediate vacancy for RESIDENT HOUSE SURGEON in General Surgery and Gynæcology (Senior House Officer or pre-registration). This post offers splendid opportunity of experience in modern well-equipped hospital.

Applications, naming 2 referees, to Group Secretary, Scunthorpe Hospital Management Committee.

SEDGEFIELD GENERAL HOSPITAL, Sedgefield, STOCKTON-ON-TEES, CO. DURHAM. (336 Beds.) SENIOR HOUSE OFFICER ANÆSTHETIST required. Married accommodation available, full Consultant staff employed. Post is recognised in connection with higher examinations, and there is provided a good medical library.

Detailed applications and names of 2 referees to the Group Secretary, North Tees-side Hospital Management Committee, at the above address as soon as possible.

SHOREHAM-BY-SEA, SUSSEX. SOUTHLANDS HOSPITAL. (411 Beds.) HOUSE PHYSICIANS. Posts vacant 1st and 19th January.

Applications to Hospital Secretary.

A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.

SHOREHAM-BY-SEA, SUSSEX. SOUTHLANDS HOSPITAL. (427 Beds.) WORTHING GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SURGICAL REGISTRAR. Vacant from 16th February, 1959. Post recognised by R.C.S. for Fellowship.

Forms of application are available from the undersigned.

A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.
129, Brighton-road, Worthing, Sussex.

SHOREHAM-BY-SEA, SUSSEX. SOUTHLANDS HOSPITAL. (411 Beds.) HOUSE SURGEON. Post recognised by R.C.S. for Fellowship; entails duties in general surgery and orthopædics; vacant 1st January.

Applications to Secretary, Southlands Hospital.

A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.

SHREWSBURY. EYE, EAR AND THROAT HOSPITAL. SENIOR HOUSE OFFICER (E.N.T.) Duties at E.N.T. Hospital (68 Beds) and Copthorne Hospital (168 Beds). Post recognised for the D.L.O. and F.R.C.S. Vacant 29th November, 1958.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY/COPTHORNE HOSPITAL. (500 Beds.) Locum HOUSE PHYSICIAN (Senior House Officer grade). Pre-registration candidates eligible. Vacant immediately.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY/COPTHORNE HOSPITAL. (500 Beds.) Senior House Officer to work as CLINICAL PATHOLOGIST to Group Laboratory. Appointment tenable for 1 year, resident or non-resident. Recognised for Diploma in Pathology. Vacant 1st January, 1959. A Unit of the Public Health Laboratory service is housed in the same building and there are facilities for training in all the 4 main branches of pathology.

Applications to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury, naming 3 referees.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. Locum SENIOR HOUSE OFFICER (casualty) required 24th November–14th December. Resident post.

Applications, with names of 2 referees, to Secretary.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. Locum HOUSE SURGEON required from 8th December to 4th January.

Applications, with names of 2 referees, to Secretary.

SOUTHAMPTON CHILDREN'S HOSPITAL. (Recognised by Conjoint Board for D.C.H.). HOUSE OFFICER required. Total establishment of 3 Residents. Salary, &c., as nationally advocated.

Applications, with copies of testimonials, to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON EYE HOSPITAL. (32 Beds. Recognised for D.O. examination.) RESIDENT SENIOR HOUSE OFFICER required end of December.

Applications, with copies of testimonials, should be forwarded as soon as possible to the Secretary, Southampton Group Hospital Management Committee, Bullar-street.

SOUTHAMPTON GENERAL HOSPITAL. (465 Beds. Recognised for F.R.C.S.) RESIDENT HOUSE SURGEON required end of November. Pre-registration candidate eligible.

Applications should be forwarded to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton, with copies of recent testimonials.

SOUTHEND. GENERAL HOSPITAL. (262 Beds.) HOUSE SURGEON (pre-registration) required. Post vacant 17th December, 1958.

Applications, stating age, qualifications and previous experience, with copies of recent testimonials (1 testimonial sufficient from applicants for first appointment), should reach the Secretary by 5th December, 1958.

SOUTHPORT AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. (Recognised for pre-registration and F.R.C.S.) HOUSE OFFICER or SENIOR HOUSE OFFICER (general surgery and gynæcology). Post vacant now.

Apply, with 2 copy testimonials, to Group Secretary, Southport and District Hospital Management Committee, Promenade Hospital, Southport.

SOUTHPORT GENERAL INFIRMARY. (189 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER (resident). Whole-time casualty appointment. Post vacant mid-January.

Apply, with 2 copy testimonials, to Group Secretary, Southport and District Hospital Management Committee, Promenade Hospital, Southport.

STAFFORD. STAFFORDSHIRE GENERAL INFIRMARY. (175 Beds—Recovery Unit 32 Beds.) HOUSE SURGEON. Pre-registration post. Vacant January. At end of service the successful applicant will be considered for pre-registration post of House Physician if he or she has not held such an appointment.

Applications to Group Secretary, Stafford Hospital Management Committee, 13, Foregate-street, Stafford.

ST. HELENS AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. The following Resident House Officer posts become vacant on 1st March, 1959.

St. Helens Hospital (196 Beds)
HOUSE PHYSICIAN.
HOUSE SURGEONS (2).

Whiston Hospital, Prescot (892 Beds)
HOUSE PHYSICIANS (3).
HOUSE PHYSICIAN (pediatric).
HOUSE SURGEONS (2).
HOUSE SURGEONS (obstetrics).

The above posts are recognised for pre-registration service. The surgical posts are recognised for the F.R.C.S. examinations, and the paediatric post recognised for the D.C.H. examination.

Applications, stating age, date of qualification and experience, and giving 2 names for reference, should be forwarded to the Group Secretary, Whiston Hospital, Prescot, immediately. Please state for which post application is made.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) SENIOR HOUSE OFFICER, resident, required for the Gynæcological and Obstetric Departments. Post recognised for D.Obst.R.C.O.G. and vacant about 8th December, 1958.

Applications to Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) HOUSE SURGEON (House Officer grade) required for 1 of the 2 surgical teams. (Post recognised for F.R.C.S.) Post vacant 9th December, 1958, and tenable for 6 months. Preference given to candidates seeking post under the Medical Act, 1950.

Applications to Secretary, Mid-Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ASAPH HOSPITAL, St. Asaph, Flintshire. Appointment of HOUSE OFFICER. Duties divided between ophthalmology (16 Beds), E.N.T. (12 Beds), and oral surgery (4 Beds).

Applications, stating age, qualifications and experience, accompanied by 2 recent testimonials, to be sent forthwith to the Group Secretary, Clwyd and Deeside Hospital Management Committee, Rhianfa, Russell-road, Rhyl.

STOCKPORT AND BUXTON HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (ophthalmology and general surgery) required, with duties at Stepping Hill Hospital, Stockport, and Outpatient Clinics at Stockport Infirmary. Recognised for the D.O.M.S.

Applications, with full particulars, and copies of 2 testimonials, to the Group Secretary, 59B, Shaw Heath, Stockport.

STOCKPORT INFIRMARY. Stockport and Buxton HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (non-resident Casualty Officer). Hours of duty: 8.30 A.M.–4.30 P.M. Monday–Friday; 8.30 A.M.–12 NOON Saturday. The post is recognised under F.R.C.S. regulations and would suit a candidate wishing to study for higher qualifications. It is vacant 15th December, 1958.

Applications, stating age, qualifications and experience, together with copies of 2 testimonials, to be addressed to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw Heath, Stockport, Cheshire.

STOCKPORT INFIRMARY. (163 Beds.) Applications are invited for the post of HOUSE OFFICER (general surgery). This is an approved pre-registration post and is recognised for the F.R.C.S.

Applications, with copies of 2 testimonials, to the Group Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw Heath, Stockport.

STOCKPORT. STEPPING HILL HOSPITAL. (529 Beds.) Applications are invited for the pre-registration post of HOUSE OFFICER (surgery).

Applications, with full particulars and copies of 2 testimonials, to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw Heath, Stockport.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. (815 Beds.) STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON (general surgery) required. Pre-registration post vacant now. Recognised for F.R.C.S. No casualty work.

Applications to the Hospital Secretary.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. (455 Beds.) SENIOR HOUSE OFFICER (orthopædics) required. Post vacant very shortly. Some duties also at Hartshill Orthopædic Hospital.

Detailed applications, with copy testimonials, to Hospital Secretary.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE OFFICERS (general surgery) required. Pre-registration. 2 posts vacant early January. Recognised for F.R.C.S.

Detailed applications, with copy testimonials, to Hospital Secretary, North Staffordshire Royal Infirmary, Stoke-on-Trent.

STRATFORD-ON-AVON GENERAL HOSPITAL. (163 Beds.) SENIOR HOUSE OFFICER (Resident Medical Officer) required. Post vacant January, 1959. Duties on medical wards under supervision of Consultant staff. Appointment gives good experience in general medicine and is suitable for one working for a higher qualification. 3 other resident staff.

Applications, giving qualifications and experience, together with copies of 2 testimonials, to Hospital Secretary.

SUTTON AND CHEAM HOSPITAL. Cotswold-road, SUTTON, SURREY. (146 Beds.) SURGICAL REGISTRAR. Post vacant 1st February. Candidates may visit Hospital by prior arrangement with Secretary (telephone : VIG. 8691).

Forms of application, returnable by 6th December, obtainable from the Group Secretary, St. Helier Hospital, Carshalton, Surrey.

SUTTON AND CHEAM HOSPITAL, Cotswold-road, SUTTON, SURREY. RESIDENT SENIOR HOUSE OFFICER (Casualty Officer). Post recognised for F.R.C.S. Vacant now.

Applications, stating age, qualifications and experience, with copies of recent testimonials and the names of 2 referees, to the Group Secretary, St. Helier Hospital, Carshalton, Surrey.

SWANSEA HOSPITAL, Swansea. (413 Beds.) Glantawe HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident post of SENIOR HOUSE OFFICER in the E.N.T. Department of the above Hospital. Vacancy 27th December, 1958. The Hospital is recognised under the regulations for the F.R.C.S. (E.N.T.) and the D.L.O.

Applications, stating age, qualifications and experience, together with the names of 2 referees, should be forwarded to the Hospital Secretary by 8th December, 1958.

T. E. JONES, Group Secretary.

SWANSEA HOSPITAL, Swansea. (413 Beds.) Glantawe HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident post of SENIOR HOUSE OFFICER in the Traumatic and Orthopædic Department of the above Hospital. Vacancy 1st January, 1959. The post is recognised under the F.R.C.S. regulations for 6 months' casualty training. It offers exceptional experience in all aspects of traumatic surgery as occurring in a large industrial centre and port.

Applications, stating age and experience, together with copies of 2 recent testimonials, should be forwarded to the Hospital Secretary by 8th December, 1958.

T. E. JONES, Group Secretary.

SWINDON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications invited for post of RESIDENT HOUSE SURGEON for general surgical unit of 80 Beds at Victoria Hospital, Swindon. Recognised for F.R.C.S. and training under pre-registration internship regulations. Married accommodation is available.

Full details, giving names of 3 referees, to Secretary, 7, Okus-road, Swindon.

SWINDON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications invited for post of RESIDENT HOUSE PHYSICIAN in acute medical unit of 64 Beds at St. Margaret's Hospital. Recognised for training under pre-registration internship regulations.

Full details, with names of 3 referees, to Secretary, 7, Okus-road, Swindon.

TAUNTON AND SOMERSET HOSPITAL, Taunton, SOMERSET. Locum HOUSE PHYSICIAN required for approximately 2 months.

Applications, stating age, nationality and qualifications, together with the names of 2 referees, should be forwarded to the Group Secretary, Taunton Hospital Management Committee, Musgrove Park Hospital, Taunton.

TAUNTON AND SOMERSET HOSPITAL, Taunton, SOMERSET. SENIOR HOUSE OFFICER (anæsthetics) required. Post, vacant early December, is recognised for F.F.A. R.C.S. and D.A. A Registrar in Anæsthetics is also employed in the South Somerset Clinical Area, in which the above is the principal General Hospital.

Applications, stating age, nationality, experience in anæsthetics (if any), together with the names of 2 referees, to the Group Secretary, Taunton Hospital Management Committee, Musgrove Park Hospital, Taunton.

TILBURY AND RIVERSIDE GENERAL HOSPITAL, ORSETT BRANCH, ORSETT, ESSEX. Applications are invited for the post of RESIDENT ORTHOPÆDIC HOUSE SURGEON at the above Hospital. The post is recognised under the Medical Act for pre-registration purposes, and suitable candidates are invited to apply. There exists a new Casualty Reception Unit at this Hospital. The appointment, which becomes vacant immediately, is for 6 months in the first instance.

Applications, together with copies of recent testimonials, should be forwarded to the undersigned.

G. E. WHYTE, Group Secretary,
Tilbury and South East Essex
Hospital Management Committee.

Thurrock Hospital, Grays, Essex.

TILBURY AND RIVERSIDE GENERAL HOSPITAL. ORSETT BRANCH, ORSETT, ESSEX. Applications are invited from registered medical practitioners for the post of RESIDENT SENIOR HOUSE PHYSICIAN with paediatric and other duties at the above Hospital. The post, which becomes vacant early in December, is for 6 months in the first instance, and is recognised for the D.C.H.

Applications, together with copies of recent testimonials, should be forwarded to the undersigned.

G. E. WHYTE, Group Secretary,
Tilbury and South East Essex
Hospital Management Committee.

Thurrock Hospital, Grays, Essex.

TORQUAY. TORBAY HOSPITAL. (180 acute general beds.) HOUSE OFFICER (medicine), Male or Female, required for last week of November. Pre-registration appointment. General duties which will include some work in the E.N.T., the Ophthalmic, and Radiotherapy Departments.

Applications, stating qualifications, nationality, age, together with copy testimonials (quoting reference F.955/91), to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

TORQUAY. TORBAY HOSPITAL. Senior Resident HOUSE OFFICER (medicine) required end November, 1958. There is a complement of 7 Resident House Officers.

Applications, stating qualifications, age, nationality, with copy testimonials (quoting reference F. 955.90) to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

WAKEFIELD. PINDERFIELDS GENERAL HOSPITAL. REGIONAL THORACIC CENTRE. Applications invited for SENIOR HOUSE PHYSICIAN and SENIOR HOUSE SURGEON. Salary £819 10s. p.a. £150 p.a. charged for accommodation. Married accommodation available.

Address written applications, giving full personal particulars, details of experience, and 2 names and addresses for reference, to W. BOWRING, Group Secretary, Pinderfields General Hospital, Wakefield.

WAKEFIELD. PINDERFIELDS GENERAL HOSPITAL. REGIONAL THORACIC CENTRE. Applications invited for position of JUNIOR HOSPITAL MEDICAL OFFICER. Salary scale £852 10s.–£55–£1182 10s. p.a. £170 p.a. charged for accommodation. Married accommodation available.

Address written applications, giving full personal particulars, details of experience and 2 names and addresses for reference, to W. BOWRING, Group Secretary, Pinderfields General Hospital, Wakefield.

WAKEFIELD. STANLEY ROYD HOSPITAL, Aberford-road, WAKEFIELD. Applications are invited from General Practitioners or other Physicians with experience in anæsthetics for posts of ASSISTANT PHYSICIANS (part-time) at the above Hospital, to assist mainly with physical treatments such as electroplexy, for part morning sessions. Salary £183 15s. p.a. for each notional half-day.

Address written applications, giving full personal particulars, details of qualifications, experience, &c., and 2 names and addresses for reference, to W. BOWRING, Group Secretary, Pinderfields General Hospital, Wakefield.

WALSALL HOSPITAL MANAGEMENT COMMITTEE. Locum HOUSE PHYSICIAN required for the Walsall General (Sister Dora) Hospital.

Apply Group Secretary.

WARWICK (near). KING EDWARD VII MEMORIAL CHEST HOSPITAL, HERTFORD HILL, near WARWICK. (Diseases of the chest—228 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER, resident. The Hospital is a modern one with a thoracic surgical unit.

Applications, with names and addresses of 3 referees, to Medical Superintendent.

WATFORD. SHRODELLS HOSPITAL. Applications are invited for the post of GYNÆCOLOGICAL HOUSE OFFICER (Junior Hospital Medical Officer grade), to take up duty early January. Post recognised for the M.R.C.O.G.

Applications, together with copies of 2 testimonials, should reach the Medical Administrator as soon as possible.

WATFORD. SHRODELLS HOSPITAL. (General Hospital—380 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER to the Geriatric Unit. Resident or non-resident. This unit of 180 Beds, under a full-time Consultant Geriatrician, offers excellent clinical experience in diagnosis and treatment of acute and other illnesses in the elderly. Full laboratory and radiological facilities. Adequate time for reading.

Applications, together with copies of not more than 2 testimonials, should reach the Medical Administrator as soon as possible.

WATFORD. SHRODELLS HOSPITAL. (380 Beds.) Applications are invited for the post of HOUSE PHYSICIAN (pre- or post-registration), to take up duty early January.

Applications, with copies of 2 recent testimonials, should reach the Medical Officer-in-charge as soon as possible.

WELSH REGIONAL HOSPITAL BOARD.

REGISTRAR (paediatrics), based Merthyr General Hospital, Merthyr, to serve Merthyr and Aberdare Hospital Management Committee. Married quarters may be available.

REGISTRARS in Plastic Surgery, St. Lawrence Hospital, Chepstow (182 Beds). Expected to visit other hospitals in South Wales area. Considerable opportunities for training in specialty. Accommodation for single person.

REGISTRAR (traumatic surgery), based at St. David's Hospital, Cardiff. Non-resident.

Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WESTON-SUPER-MARE GENERAL HOSPITAL. (104 Beds.) Applications are invited from duly qualified medical practitioners for the pre-registration appointment of HOUSE PHYSICIAN. Single residential accommodation provided. Vacant January, 1959.

Applications, stating age, qualifications, together with names and addresses of 2 referees, should be addressed to the Group Secretary, Weston-super-Mare Hospital Management Committee.

WIGAN AND LEIGH HOSPITAL MANAGEMENT COMMITTEE. LEIGH INFIRMARY, LEIGH. SENIOR HOUSE OFFICER required for Casualty Department, with gynæcological and surgical duties at Astley Hospital.

Apply Secretary, Knowsley House, Wigan.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOS-PITAL. (324 Beds.) SENIOR HOUSE OFFICER (orthopædics) required. Post recognised F.R.C.S. Wide experience under area orthopædic team. Appointment for 6 months in first instance. Vacant 13th December, 1958.

Applications, with copies of 2 testimonials, to the Hospital Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOS-PITAL. (324 Beds.) HOUSE SURGEON (post recognised by the Royal College of Surgeons) required for General Surgery with some E.N.T. duties. Approved pre-registration post. Vacant 1st December.

Applications, with copies of 2 testimonials, to the Hospital Secretary.

WINDSOR. KING EDWARD VII HOSPITAL. House SURGEON in General Surgery required, Male or Female, for post vacant 29th November. Recognised for F.R.C.S. Pre-registration post.

Applications, stating age, nationality, qualifications, and copies of recent testimonials, to Secretary.

WINDSOR. KING EDWARD VII HOSPITAL. House SURGEON in General and Orthopædic Surgery required, Male or Female. Recognised for F.R.C.S. Pre-registration post.

Applications, stating age, nationality, qualifications, with dates, and copies of recent testimonials, to Secretary.

WINDSOR. KING EDWARD VII HOSPITAL. House SURGEON in General Surgery required, Male or Female, for post vacant 2nd January. Recognised for F.R.C.S. Pre-registration post.

Applications, with copies of recent testimonials, stating age, nationality, qualifications, with dates, to Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) Pre-registration HOUSE OFFICERS (general surgery). Posts recognised for F.R.C.S. Vacancies occurring immediately and on 1st and 8th January.

Apply, with copies of 2 testimonials, to the Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) SENIOR HOUSE OFFICER (anæsthetics). Post vacant 20th January. Recognised for D.A. and F.F.A. R.C.S.

Apply, with copies of 2 testimonials, to the Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) Pre-registration HOUSE OFFICER (paediatrics). Post recognised for D.C.H. Vacant 26th January, 1959.

Apply, with copies of 2 testimonials, to the Secretary.

WOKING, SURREY. VICTORIA HOSPITAL. (72 Beds.) SENIOR HOUSE OFFICER (post-registration appointment) required for medical, surgical and casualty duties.

Apply, with 2 testimonials, to Hospital Secretary.

WOKING AND CHERTSEY GROUP HOSPITAL MANAGEMENT COMMITTEE. GYNÆCOLOGICAL REGISTRAR required end of January for duty in above Group of hospitals based on St. Peter's Hospital, Chertsey (total of about 40 gynæcological beds); also to assist at maternity units as required. Further information about the post may be obtained from the Consultant Gynæcologist at St. Peter's Hospital (telephone: Ottershaw 441).

Application forms from Group Secretary, Huntington, Guildford-road, Chertsey, Surrey. Closing date 1st December, 1958.

WORCESTER ROYAL INFIRMARY. House Surgeon (pre-registration or otherwise) required for General Surgery post at this busy general hospital of 213 Beds. The appointment offers wide and varied experience and is recognised for the F.R.C.S. examinations.

Applications to Hospital Secretary.

NORTHERN IRELAND HOSPITALS AUTHORITY. Applications are invited for a whole-time post as REGISTRAR or SENIOR REGISTRAR in General Surgery at Mid-Ulster Hospital. The terms and conditions will be in accordance with the application of the Spens report to Northern Ireland.

Applications to be made on a form obtainable (with further particulars) from the Secretary, Northern Ireland Hospitals Authority, 44–46, Queen-street, Belfast, and to be returned not later than 10th December, 1958.

IBADAN, NIGERIA. UNIVERSITY COLLEGE HOSPITAL. RADIODIAGNOSTIC DEPARTMENT. The Board of Management invite applications from registered medical practitioners with the requisite postgraduate experience for appointment as SENIOR REGISTRAR in the above Teaching Hospital.

The salary offered for the post is £1542 rising by 3 annual increments to £1722 p.a. In addition, an inducement addition of £300 p.a. is payable to an expatriate doctor.

Candidates will be expected to possess the D.M.R.D. or equivalent qualification. The radiology department is one of radiodiagnosis only. Last year over 30,000 examinations were carried out. Further details of the radiology department, i.e., equipment, staff, &c., are available on application to the London Office.

The appointment will be initially for 1 tour of 12 months renewable, for subsequent tours, by mutual agreement.

On satisfactory completion of the agreement a gratuity of £37 10s. will be paid for each completed term of 3 months' service.

An outfit allowance of £60 is payable on first appointment.

Partly furnished quarters are provided at a rental of 8½% of salary excluding inducement allowance, and an expatriate doctor appointed will be eligible for 7 days' leave on full pay for each completed month of service in Nigeria. A Nigerian doctor is eligible for 5 days' leave for each completed month of service.

Free first-class passages are provided for expatriate doctors and their wives on first appointment, for vacation leave, and on completion of the agreement. Free first-class passages to Nigeria will, in certain circumstances, be provided for non-expatriate doctors.

Candidates will be eligible for children's allowances in accordance with existing regulations.

Arrangements can be made to enable doctors to continue their N.H.S. superannuation scheme contributions, and details of the revised salary and gratuity payable in such cases will accompany application forms.

Applications should be submitted not later than 6th December, 1958, on the appropriate forms, which will be forwarded, together with additional information, on receipt of an addressed foolscap envelope by the Adviser on Staff Recruitment, London Office, University College Hospital, Ibadan, 57, Catherine-place, Palace-street, London, S.W.1.

MICHIGAN, U.S.A. OAKWOOD HOSPITAL, Dearborn, MICHIGAN. Applications are invited for 1- or 2-year approved GENERAL PRACTICE RESIDENCY in modern 234-Bed general hospital 10 miles from Detroit. Excellent facilities. Hospital approved for Exchange-Visitor programme. Beginning monthly salary $250 if single, $300 if married. Free housing.

Apply: Director.

U.S.A. SAINT ELIZABETH HOSPITAL, Elizabeth, NEW JERSEY. 1-year ROTATING INTERNSHIP, A.M.A. approved. New programme in Community-Teaching Hospital. Medical Education and Research Department staffed by 35 carefully-selected Physicians who provide bedside and lecture teaching in specialties. Full-time staff members in pathology, medical education, radiology, all of whom have university faculty appointments. All patients teaching cases—active service department and clinics for interns. Courses available nearby Graduate Medical School, several conducted in Hospital, tuition paid by Hospital. Interns invited twice monthly for grand rounds at outstanding New York hospitals. Hospital located 20 miles from New York City. Limited vacancies for period 1st July, 1959–30th June, 1960. $125 monthly and maintenance.

Write: CHARLES R. REAM, M.D., Saint Elizabeth Hospital, Elizabeth 2, New Jersey.

Public Appointments

FACTORY DOCTORS. Factories Acts, 1937 and 1948. The following appointment as Appointed Factory Doctor is vacant. Apply to Chief Inspector of Factories, 19, St. James's-square, London, S.W.1.

District	*County*	*Latest date for receipt of applications*
DORKING ..	SURREY ..	6TH DECEMBER, 1958

LANCASHIRE COUNTY COUNCIL. Applications are invited from registered medical practitioners for appointments as ASSISTANT DIVISIONAL MEDICAL OFFICER in the Burnley and Lancaster areas. Possession of Diploma in Public Health desirable. Salary £1050 rising to £1475 p.a. Travelling and subsistence allowances where applicable.

Application forms and further particulars from County Medical Officer, Serial 1196, East Cliff County Offices, Preston. Application forms to be returned by 10th December, 1958.

BENFLEET, CANVEY ISLAND, AND RAYLEIGH URBAN DISTRICT COUNCILS. ROCHFORD RURAL DISTRICT COUNCIL. ESSEX COUNTY COUNCIL. Applications invited for the posts of DEPUTY MEDICAL OFFICER OF HEALTH AND ASSISTANT COUNTY MEDICAL OFFICER OF HEALTH which together constitute whole-time, 40% of time being devoted to duties as Deputy Medical Officer of Health to the District Councils and 60% to County Council duties. Applicants must possess the Diploma in Public Health.

Remuneration (in accordance with appropriate Industrial Court Awards) as follows:—

(*a*) District Councils' salary £490 13s. 4d.–£22 (4)–£578 13s. 4d. a year.

(*b*) County Council salary £735–£35 (3)–£840–£38 10s. (5)–£1032 10s. a year.

Whitley Medical Council conditions apply and also relevant Standing Orders of the employing Councils. Commencing salaries will be fixed according to qualifications and experience. Medical examination. Posts superannuable.

Application forms obtainable from the Clerk of the County Council, County Hall, Chelmsford, returnable by 8th December, 1958. Canvassing disqualifies.

BRIGHTON. COUNTY BOROUGH OF BRIGHTON. HEALTH DEPARTMENT. Applications invited from registered medical practitioners (either sex) for the whole-time appointment of SENIOR ASSISTANT MEDICAL OFFICER OF HEALTH. Salary £1605–£105–£1710.

Applicants must hold the D.P.H. and should:—

(1) Have had 2 years' experience in obstetric and child welfare work.

(2) Have been approved by the Ministry of Education for the ascertainment of educationally subnormal children.

Application forms and conditions of appointment from the Medical Officer of Health, Royal York Buildings, Brighton, 1.

Town Hall, Brighton, 1. W. O. DODD, Town Clerk.

CAMBRIDGE. COUNTY OF CAMBRIDGE. Whole-time District Medical Officer of Health and Deputy County Medical Officer. Applications are invited from duly qualified and registered medical practitioners who possess a Diploma in Public Health, Sanitary Science, or State Medicine for the joint appointment of Whole-time DISTRICT MEDICAL OFFICER OF HEALTH for the County Districts of Cambridgeshire (namely, the Rural Districts of Chesterton, South Cambridgeshire and Newmarket) and DEPUTY COUNTY MEDICAL OFFICER AND DEPUTY PRINCIPAL SCHOOL MEDICAL OFFICER. The appointment will be determinable by 3 months' notice on either side. As District Medical Officer of Health, the officer will be responsible for performing his/her duties to the Rural District Councils. As Deputy County Medical Officer he/she will act under the general control and supervision of the County Medical Officer of Health, and will be required to perform such duties as Deputy Principal School Medical Officer and such other duties as the County Council prescribe. The salary will be £2100 p.a. rising by 5 increments to a maximum of £2400, or such other salary as may be determined by any national agreement. Travelling and subsistence allowances will be payable in accordance with the County Council scale. The appointment is subject to superannuation and the successful applicant will be required to pass a medical examination. The appointment of District Medical Officer of Health is subject to the provisions of Section 110 of the Local Government Act, 1933, and the Sanitary Officers (Outside London) Regulations 1951.

Applications for the appointment, duly endorsed, should also state the names and addresses of 3 referees, and be addressed to the Clerk of the Joint Committee (W. H. HAYWARD) at the County Hall, Hobson-street, Cambridge, not later than 8th December, 1958.

CROYDON. COUNTY BOROUGH OF CROYDON. ASSISTANT MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER. Applications are invited for this established appointment from registered medical practitioners having at least 3 years' experience after qualification, for duties mainly in the School Health and Maternity and Child Welfare Services. The D.P.H. or D.C.H. will be an advantage. Salary within the scale £1050–£50–£1200–£55–£1475 p.a.

Application forms, from the Medical Officer of Health, 45, Wellesley-road, Croydon, must be returned to him by 15th December, 1958. E. TABERNER, Town Clerk.

LEICESTER. CITY OF LEICESTER. Applications are invited for the post of SENIOR SCHOOL MEDICAL OFFICER FOR SCHOOL HEALTH SERVICE from registered medical practitioners with special experience in the School Health Service; senior qualifications will be an asset. Whitley Medical Council Committee "C" conditions of service and salary scale—i.e., £1520–£1955 p.a. The appointment may be terminated by 3 months' notice. It is subject to the provisions of the Local Government Superannuation Acts, 1937 to 1953, the successful candidate being required to pass a medical examination. The officer appointed will be under the control of the Medical Officer of Health and will be required to carry out such duties within the School Health Service as may be assigned to him/her.

Applications, giving the names of 3 referees, should be sent to the undersigned, from whom application forms and further particulars may be obtained, not later than 14 days from the appearance of this advertisement.

E. K. MACDONALD, Medical Officer of Health and Principal School Medical Officer.

City Health Department, 1a, Grey Friars, Leicester.

MANCHESTER EDUCATION COMMITTEE. School MEDICAL OFFICER (Male) required for work in the School Health Service. Salary £1050–£1475 p.a. Preference given to candidates with experience in children's diseases and retinoscopy and holding D.P.H. or D.C.H.

Application forms and particulars (stamped addressed envelope) from Chief Education Officer, P.O. Box 480, Manchester 3, returnable to the Town Clerk, Town Hall, Manchester 2, by 28th November, 1958. Envelope to be endorsed "School Health Medical Officer".

EAST MIDLANDS GAS BOARD. Applications are invited from registered medical practitioners for the post of Full-time ASSISTANT MEDICAL OFFICER, who will be required to live in the vicinity of Sheffield. The commencing salary for the appointment will be at a rate not less than £1600 p.a. according to qualifications and experience. Previous experience in industrial medicine and or a Diploma in Industrial Health will be an advantage, and preference will be given to applicants who have had at least 4 years' post-registration experience in general medicine, general practice or general surgery. The post is one of responsibility and offers scope for initiative and research. The holder will be responsible to the Senior Medical Officer at Leicester for the day-to-day running of the Board's medical service in the northern part of the Area and will not be under immediate supervision. The position is pensionable and the successful applicant will be required to pass a medical examination.

Applications, stating age, education, qualifications and experience and giving the names of 2 referees, should be sent to the undersigned within 14 days of the appearance of this advertisement. A. GWYNNE DAVIES, Secretary.

Beverley House, University-road, Leicester.

NOTTINGHAM. CITY OF NOTTINGHAM HEALTH SERVICES. SENIOR ASSISTANT MEDICAL OFFICER. Applications are invited for this appointment from registered medical practitioners holding the Diploma of Public Health. Salary will be within the scale £1150–£1575 p.a.; commencing salary will be fixed in accordance with experience. The successful candidate will be given opportunities for administrative and practical experience in all services of the Health Department. The appointment is superannuable and subject to the usual conditions.

Forms of application may be obtained from the Medical Officer of Health, Huntingdon-street, Nottingham, to whom they must be returned, together with the names of 2 referees, by not later than 28th November, 1958. T. J. OWEN, Town Clerk.

Guildhall, Nottingham. October, 1958.

STAFFORDSHIRE COUNTY COUNCIL. Health Department. Appointment of COUNTY PSYCHIATRIST. Applications are invited from registered medical practitioners with suitable experience to undertake duties involving the day-to-day control of the Mental Health Section of the Department, including mental deficiency and lunacy, together with child guidance arrangements of the School Health Service. Practical experience of child guidance work is desirable and the possession of a Diploma in Psychological Medicine will be considered an advantage. The candidate will be on the staff of the County Medical Officer of Health, to whom he will be responsible. The salary scale will be in accordance with the latest Industrial Court award, i.e., £1520 p.a., rising by annual increments of £50 (1) and £55 (7) to £1955 p.a., and previous similar service may be taken into consideration when deciding the commencing rate. The candidate appointed will be required to provide a car and will be paid allowances in accordance with the County Council's scale. The appointment, which will be terminable by 3 months' notice in writing on either side, will also be subject to the provisions of the appropriate Superannuation Acts and Regulations, in which connection the successful candidate will be required to pass a medical examination and produce his or her birth certificate.

Applications, stating age, qualifications and experience, together with copies of not more than 3 recent testimonials, should reach the County Medical Officer of Health, County Buildings, Stafford, not later than 1st December, 1958. Canvassing, directly or indirectly, will disqualify, and all applicants must state whether, to their knowledge, they are related to any member or senior officer of the County Council.

T. H. EVANS, Clerk of the County Council.

County Buildings, Stafford. 5th November, 1958.

ST. HELENS. COUNTY BOROUGH OF ST. HELENS. HEALTH DEPARTMENT. Applications are invited from qualified medical practitioners for the post of ASSISTANT MEDICAL OFFICER OF HEALTH (Male or Female) at a salary of £1050 p.a. rising by annual increments to £1475 p.a. Recognition may be given to past local authority service in fixing the commencing salary. The possession of D.P.H. or D.C.H. is desirable, but not essential. Consideration for housing accommodation will be given according to the circumstances of the successful candidate.

Application forms and further particulars of appointment may be obtained from the undersigned.

G. O'BRIEN, Medical Officer of Health.

Town Hall, St. Helens, Lancs. November, 1958.

STOKE-ON-TRENT. CITY OF STOKE-ON-TRENT. Applications are invited from registered medical practitioners, holding in addition a Degree in Sanitary Science, Public Health, or State Medicine, for the post of DEPUTY MEDICAL OFFICER OF HEALTH for the City of Stoke-on-Trent at an annual salary of £1700 rising to a maximum of £1965 plus car allowance. Applicants should have had considerable experience both in the clinical and administrative aspects of a Health Department. Consideration will be given to housing accommodation on a service tenancy if required. The appointment is full-time, superannuable, subject to medical examination and terminable by 3 months' notice on either side.

Applications, with full particulars and the names of 3 persons to whom reference can be made, should be addressed to the Medical Officer of Health, St. Peter's Chambers, Glebe-street, Stoke-on-Trent, not later than 27th November, 1958. Canvassing, directly or indirectly will be a disqualification.

HARRY TAYLOR, Town Clerk.

COMHAIRLE CONNDAE NA MIDHE. The Meath County Council invite applications for the posts of RESIDENT MEDICAL OFFICER (surgical) and SURGICAL INTERN for Our Lady's Hospital, An Uaimh. Rates of salary as approved by the Department of Health.

Applicants should apply by letter immediately to the Chief Officer, Meath County Council, County Clinic, An Uaimh, County Meath, and should give full particulars of age, training, qualifications and experience. Latest date for receipt of applications is Friday, 28th November, 1958.

SOUTH CORK BOARD OF PUBLIC ASSISTANCE. Vacancy for JUNIOR RESIDENT MEDICAL OFFICER at St. Finbarr's Hospitals (Maternity Section). Salary £541 7s. 6d.–£701 7s. 6d. p.a. inclusive.

Application forms and particulars may be obtained from the County Manager, Courthouse, Cork, with whom completed applications should be lodged not later than 5 P.M. on Friday, 5th December, 1958.

WEST BROMWICH. COUNTY BOROUGH OF WEST BROMWICH. HEALTH DEPARTMENT. Applications are invited from registered medical practitioners for the temporary post of ASSISTANT MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER for a period of approximately 6 months. Possession of the D.P.H. or previous experience in public health, though desirable, is not necessary. Salary dependent on experience and qualifications, the minimum being £1050 p.a.

Applications, with full particulars and names of 2 referees, to the Town Clerk, Town Hall, West Bromwich, by 6th December, 1958.

PUBLIC SERVICE OF SOUTH AUSTRALIA. QUEEN ELIZABETH HOSPITAL, ADELAIDE. Applications are invited for the following vacancies:—

DIRECTOR OF ANÆSTHESIA.

Applicants must be legally qualified medical practitioners and should possess a senior qualification in anæsthesia. Term of 3 years, with eligibility for reappointment. Salary up to £A2716.

SENIOR ANÆSTHETIC REGISTRAR.

Applicants must be legally qualified medical practitioners with a postgraduate qualification in anæsthesia. Term of appointment from 1st February, 1959, to 31st January, 1960, with eligibility for reappointment. Salary up to £A2051.

ASSISTANT MEDICAL SUPERINTENDENT.

Applicants must be legally qualified medical practitioners. Experience in general practice and a postgraduate qualification in surgery desirable. Term of 3 years, with eligibility for reappointment. Salary up to £A2051.

Applications, setting out full names, address, date of birth, marital status, academic qualifications, practical experience, particulars of war service, copies of testimonials and a snapshot, to be submitted to Agent General for South Australia, South Australia House, Marble Arch, London, W.1.

General Practice

For an **Executive Council post** *(England and Wales) apply on form E.C.16A obtainable from the council. Mark envelope "Vacancy."*

FARNHAM ROYAL (Britwell Estate), Buckinghamshire. Applications are invited for establishment of Medical Practice on new housing estate. The estate will eventually re-house 11,000 persons from London and it is planned there shall be 2 resident doctors. 1 of these was appointed on 19th November, 1956. House, including surgery accommodation, to be rented from the London County Council. Small temporary accommodation will be provided until a purpose-built house is available. The selected applicant, if otherwise eligible, will receive the Initial Practice Allowance. Applications on Form E.C.16A, to the Clerk, Buckinghamshire Executive Council, Walton House, Walton-street, Aylesbury, Bucks, by first post, 5th December, 1958.

Miscellaneous

Applications are invited for post of Part-time Medical Secretary to Family Planning Association. Duties include coordination of medical work of Association, organisation of postgraduate courses, running of clinical trials of simple contraceptive methods and other work for Council for Investigation of Fertility Control. Medical qualifications essential. Salary at the rate of £2000–£2400 p.a.—Write F.P.A., 64, Sloane-street, London, S.W.1.

Editorial Staff of The Lancet.—The Editor is considering the appointment of an additional Assistant Editor (whole-time) and invites application from men between 27 and 32 years of age who want to make medical journalism their career. The post will carry steadily increasing responsibility, and will be suitable for a man who has been Senior Registrar or Registrar or has gained equivalent experience outside hospital. Further information may be had from the Editor at THE LANCET Office, 7, Adam-street, London, W.C.2.

20-man medical group in Central United States desires association of a well-trained ophthalmologist. Inquiry invited.—Reply to ARNOLD S. JACKSON, M.D., Jackson Clinic, Madison, Wisconsin, U.S.A.

For sale with vacant possession in Highgate, a very desirable unfurnished residence; suit Consultant or Specialist.—MOU 4336. No agents.

Pont-street. Consulting rooms available. Ground-floor flat of 3 large rooms, bathroom and kitchen. Lease 28 years, outgoings about £90 p.a., plus rates; price £5,500.—HERRING, SON AND DAW, 23, St. James's-square, S.W.1. TRAfalgar 4121.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimens of urine and £2 2s. fee. Haematology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Doctors requiring applications, theses copied: Write to MANTON (WESTMINSTER) LTD., 153, Victoria-street, S.W.1 (VIC. 0141), who are specialists.

Microscopes. Highest prices paid for good modern types. Send or bring your equipment for valuation.—WALLACE HEATON LTD., 127, New Bond-street, W.1.

Minifon (E.M.I.) Pocket Recorder P.55 "S", as new, £50. Accessories available. Address No. 444, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

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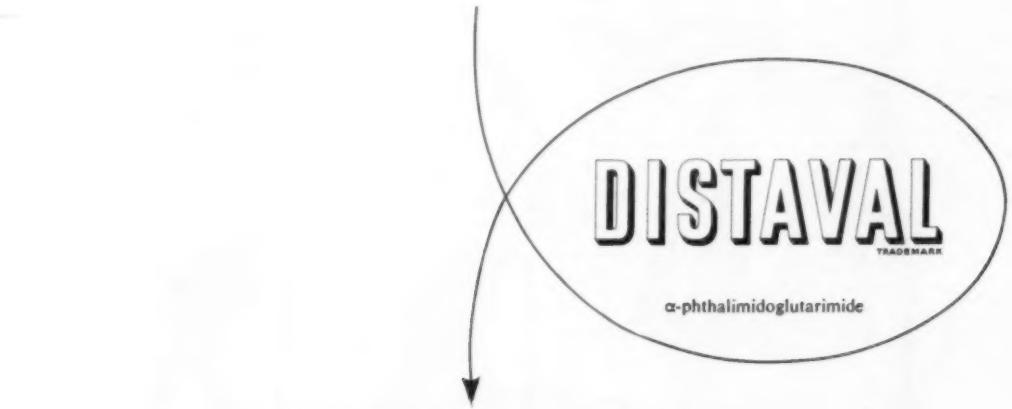

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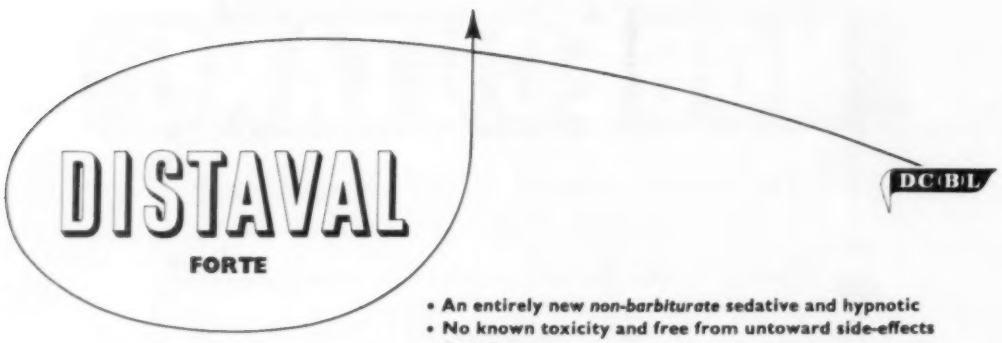

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